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THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

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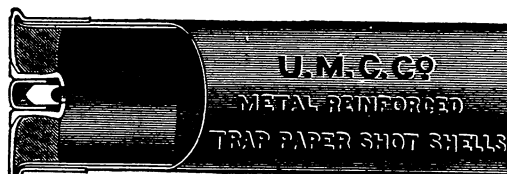
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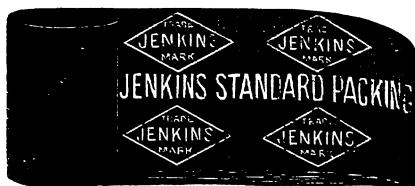
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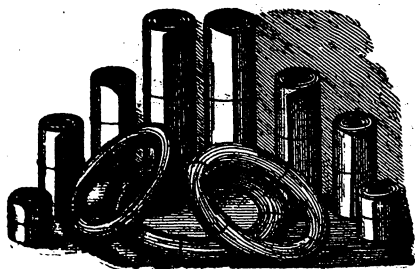
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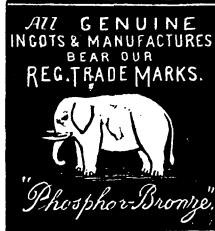
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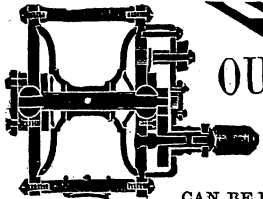
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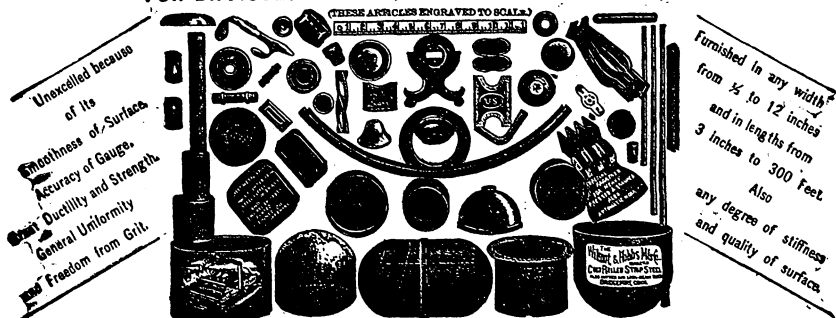
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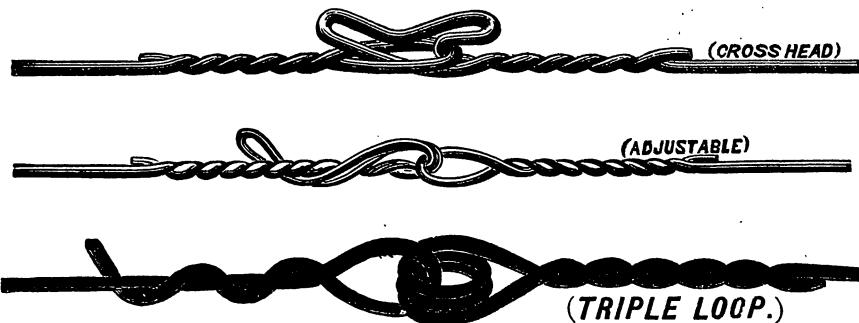
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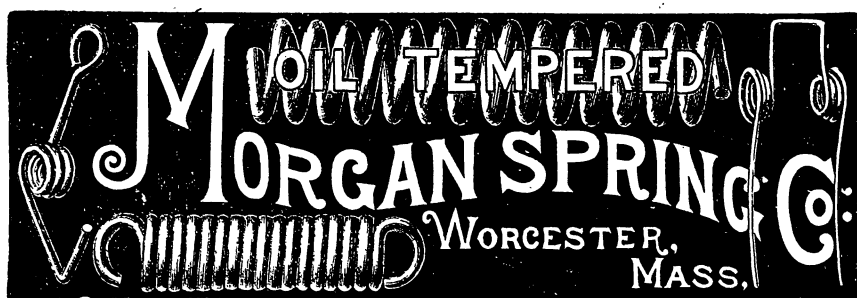
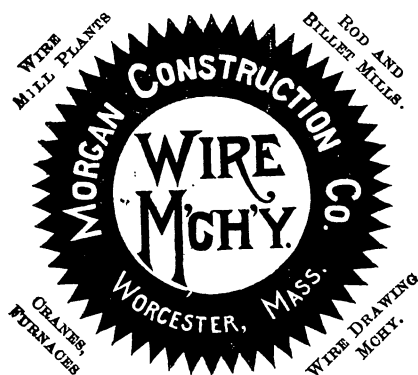


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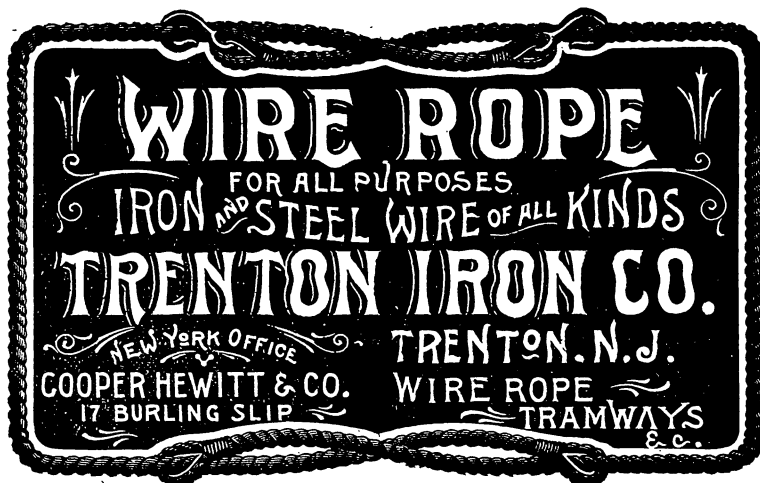


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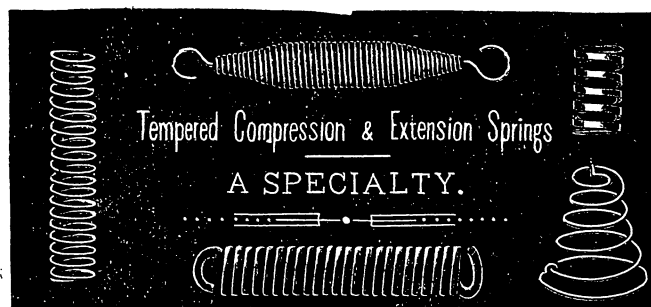
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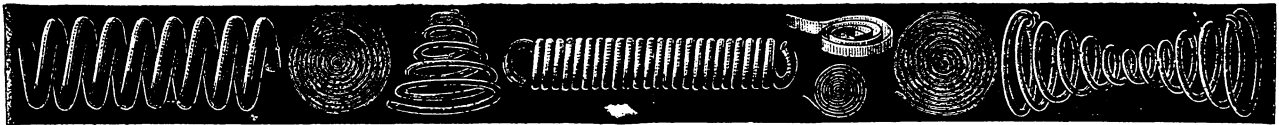
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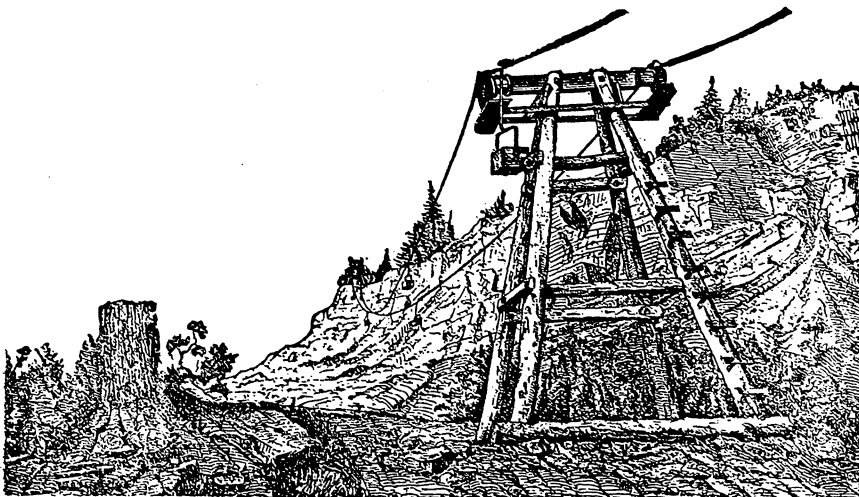
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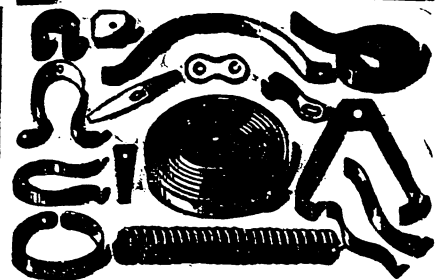
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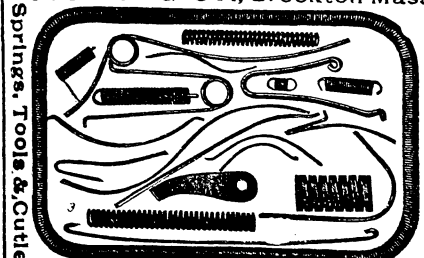
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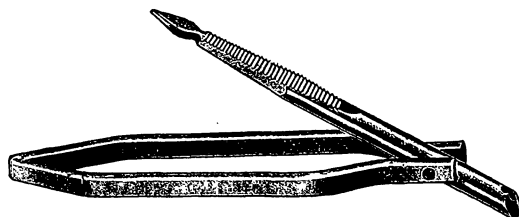


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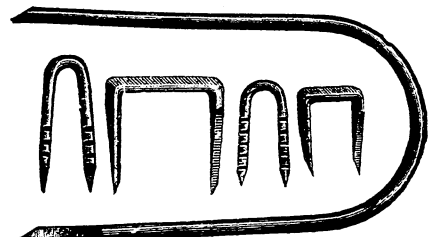
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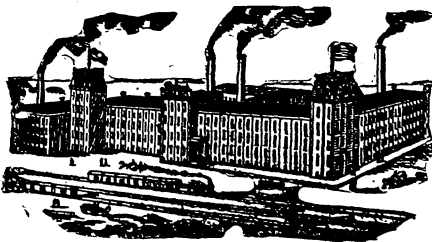
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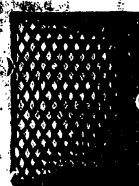


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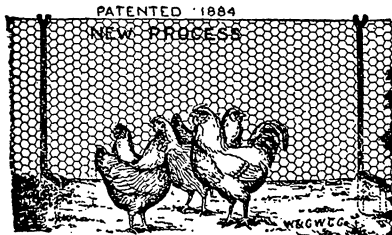
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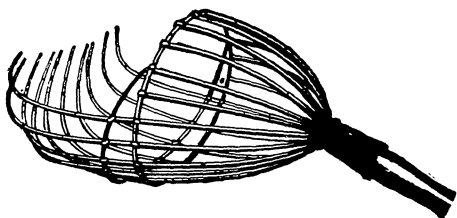
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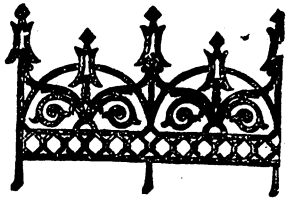
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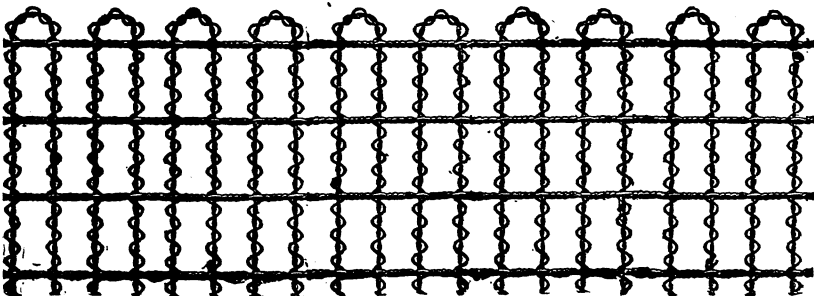
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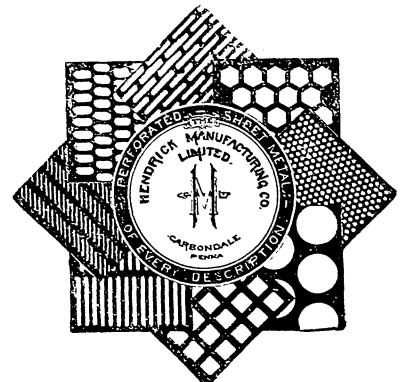
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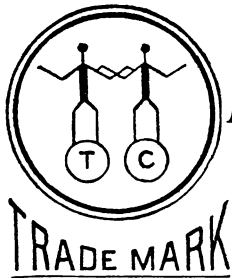
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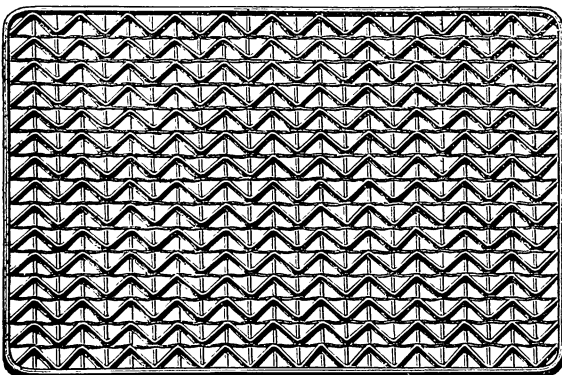
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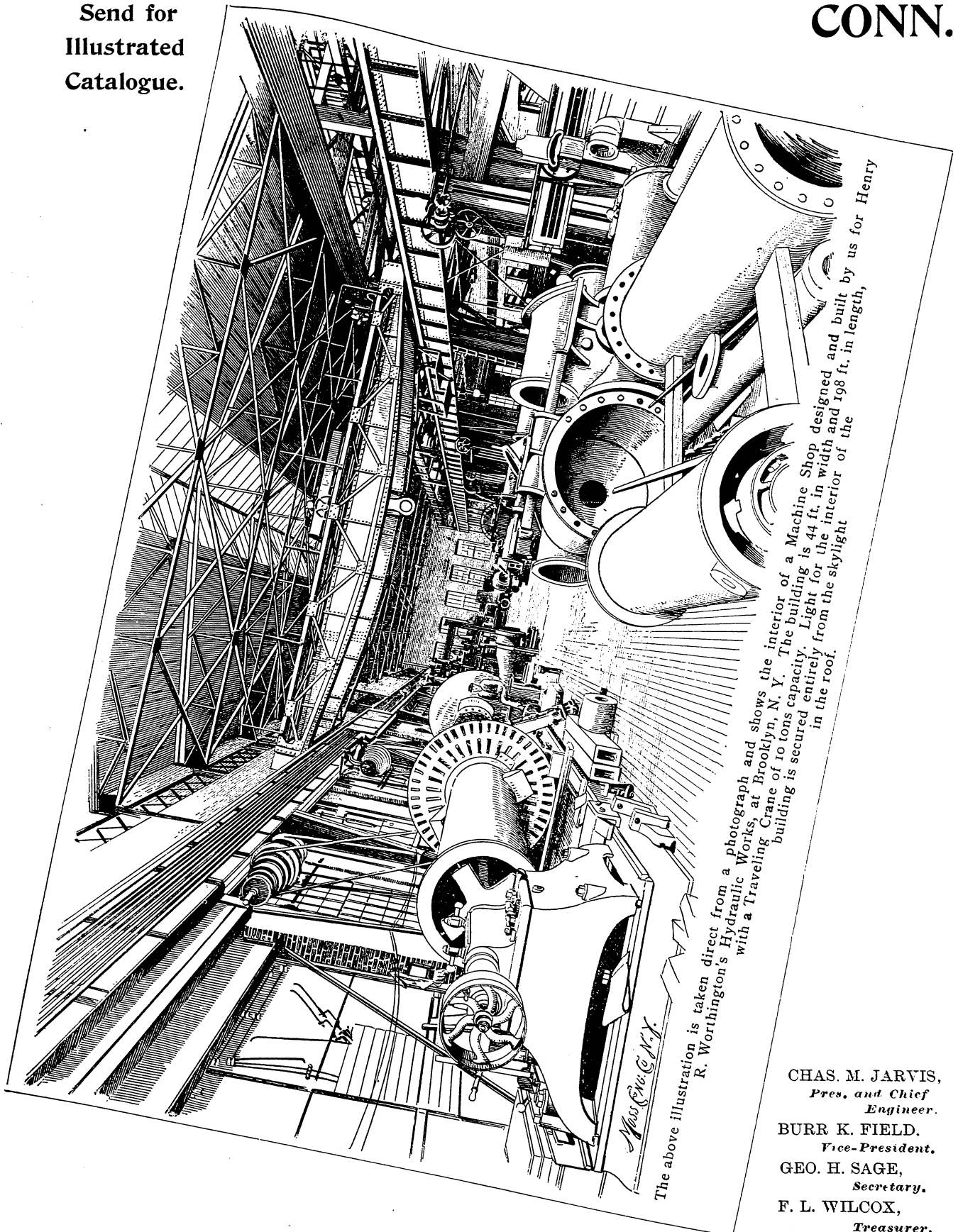
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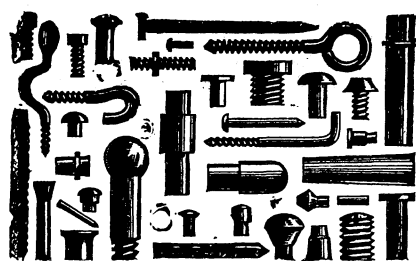
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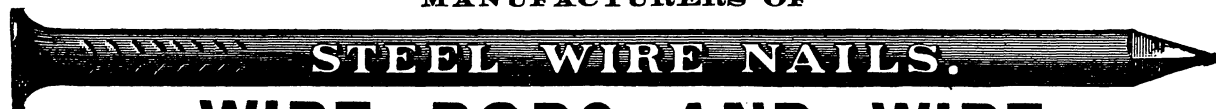
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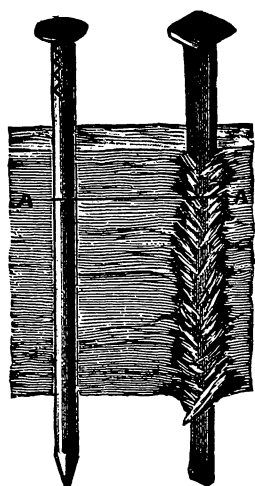
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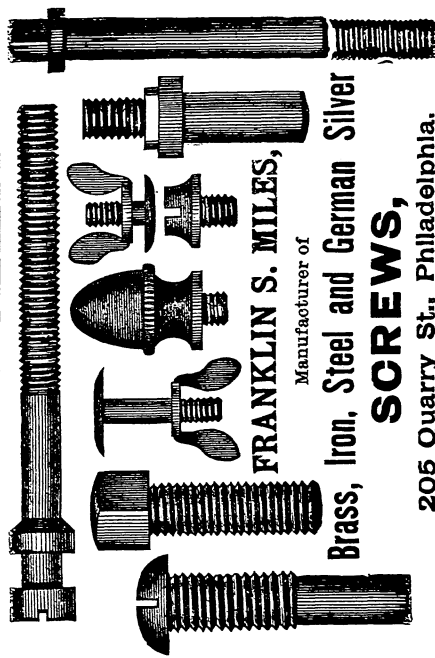
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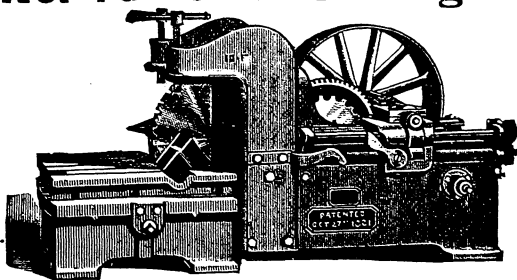
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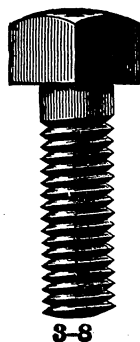
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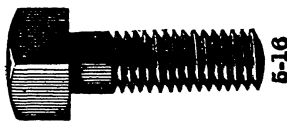
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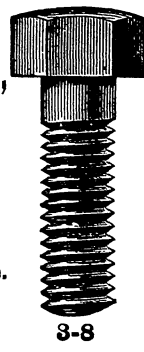
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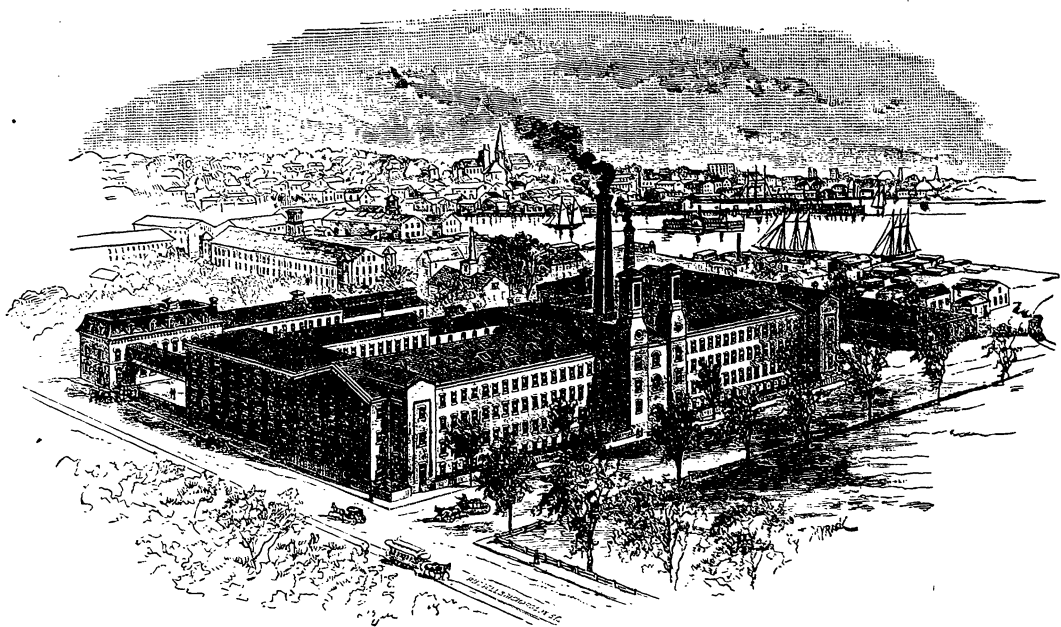
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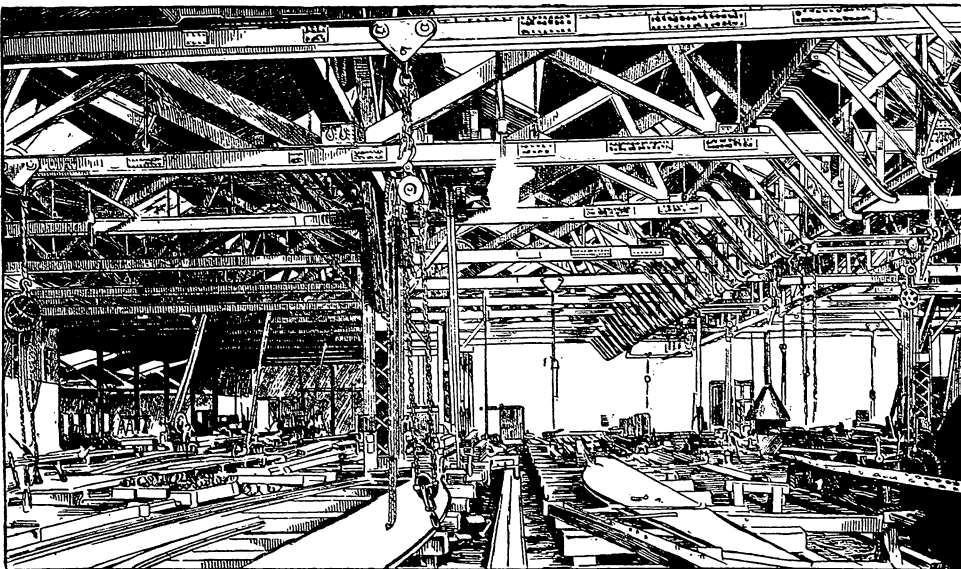
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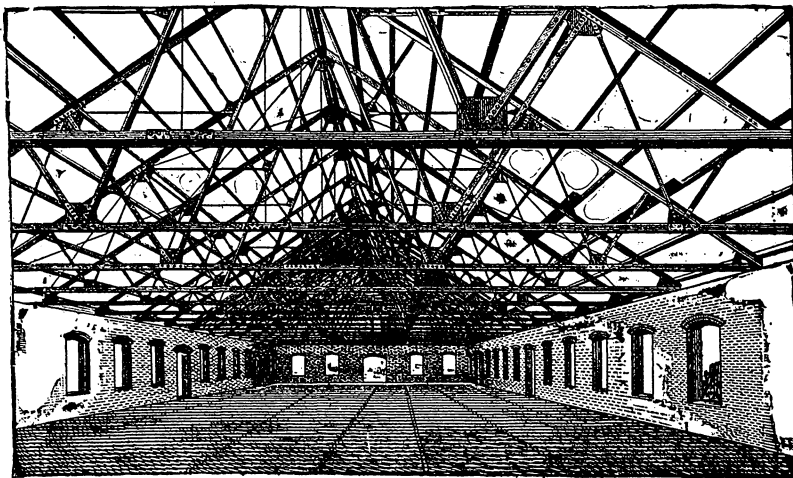
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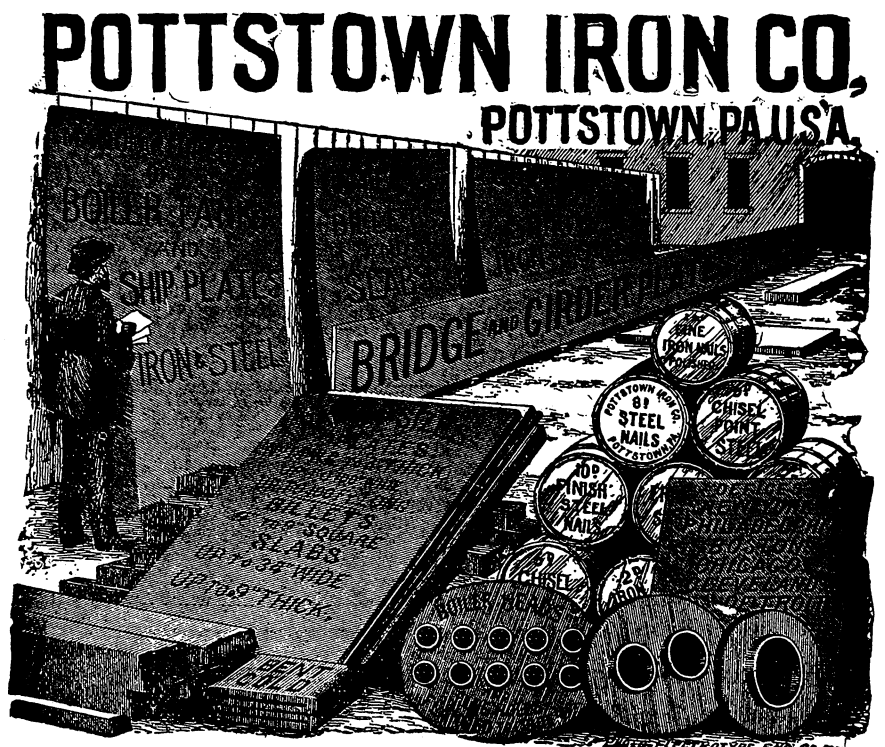
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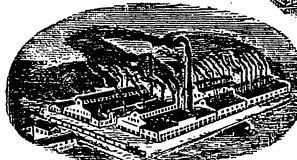
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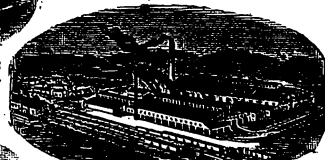
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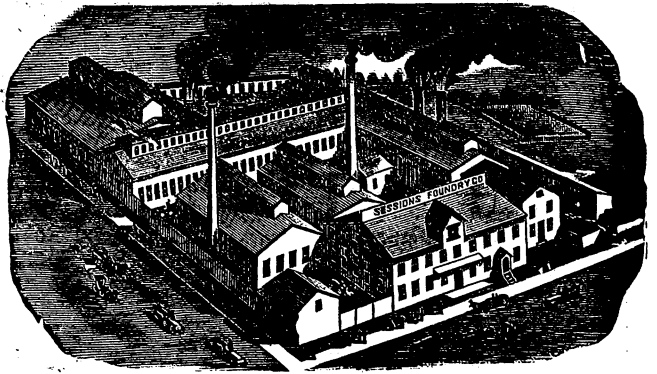
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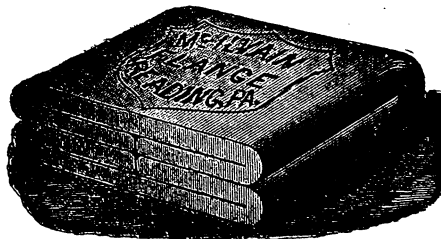
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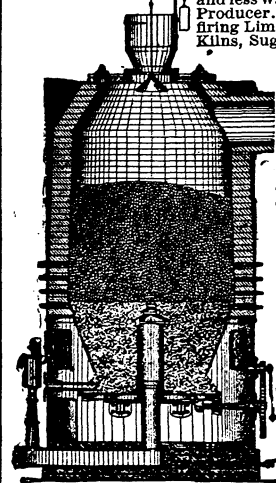
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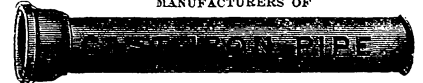
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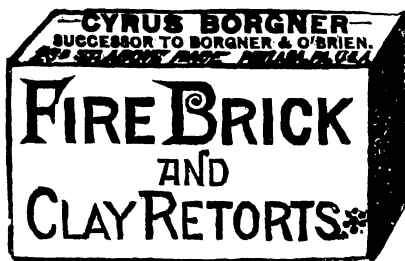
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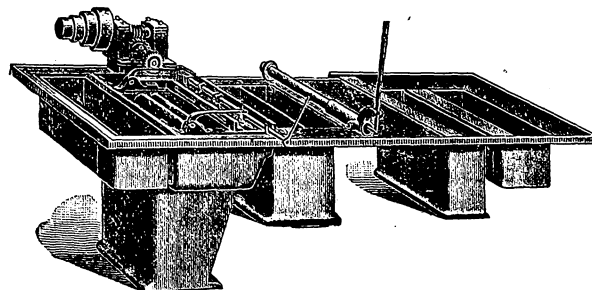
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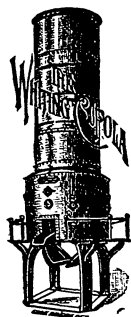
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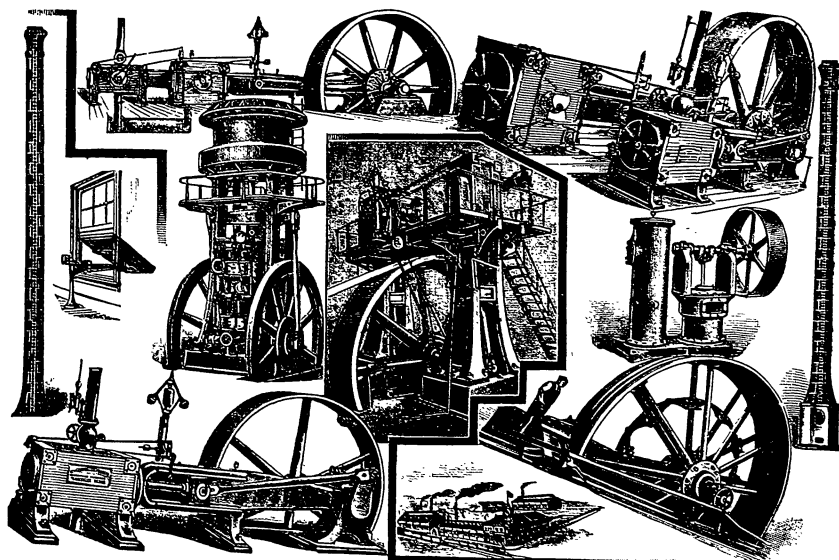
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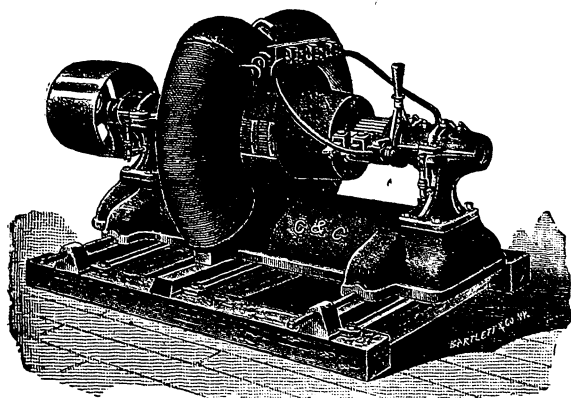
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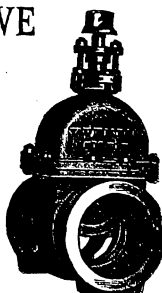
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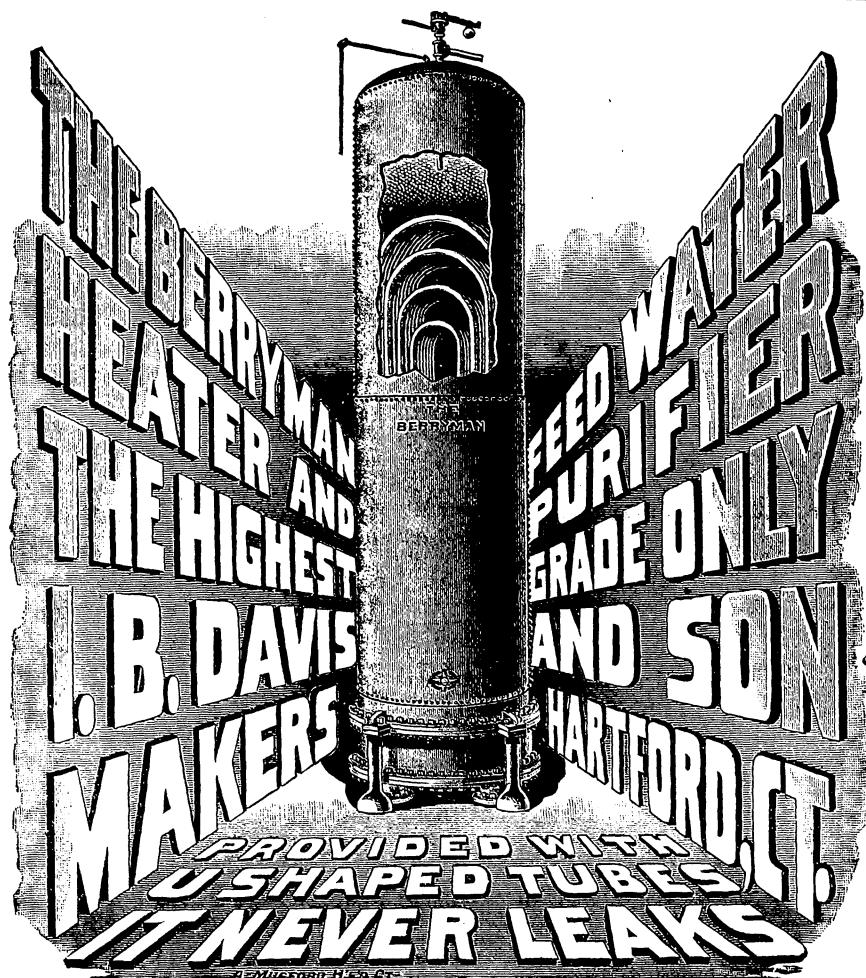
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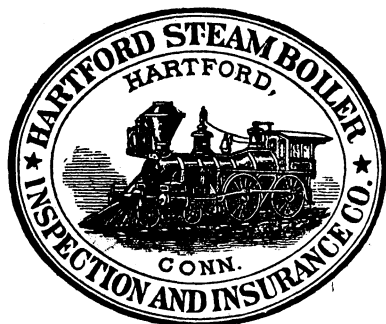
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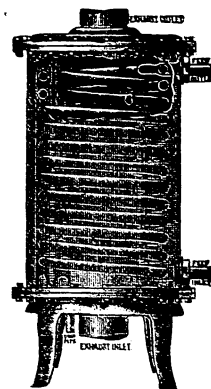
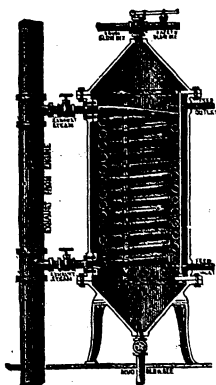
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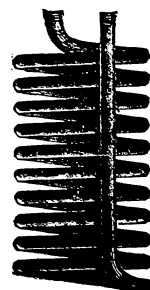
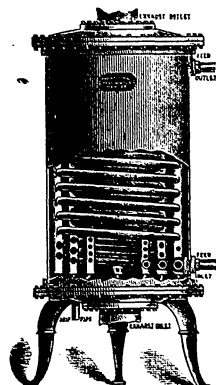


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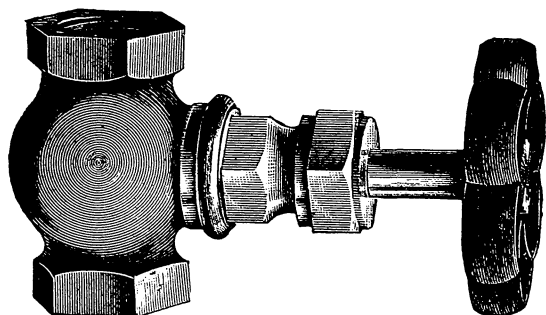
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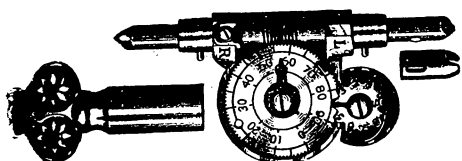
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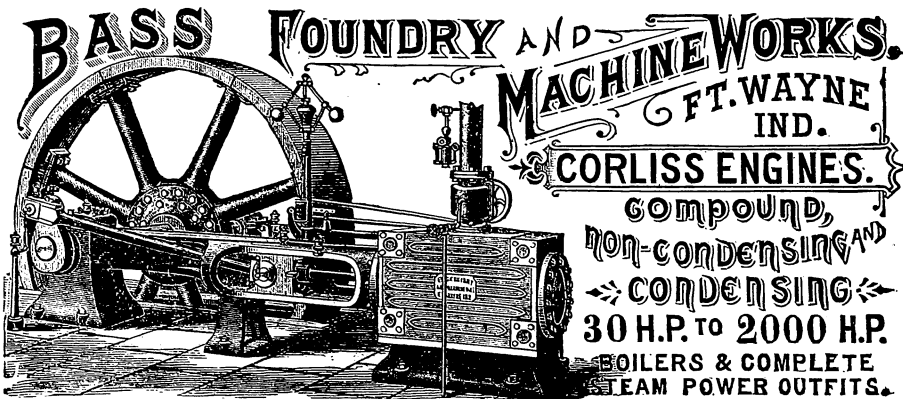
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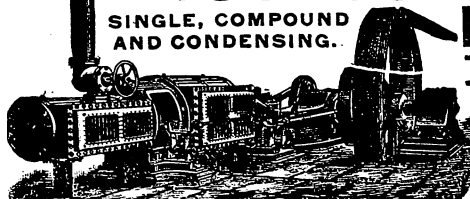
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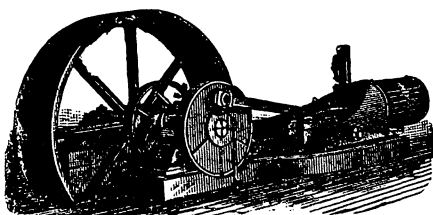


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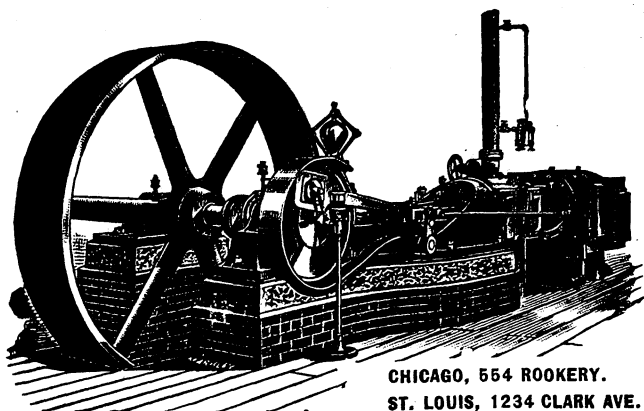
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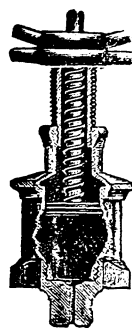
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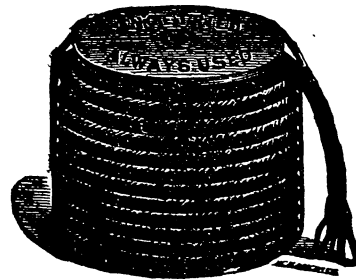
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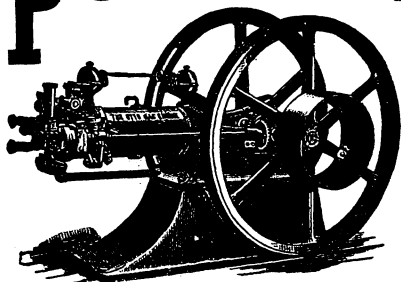
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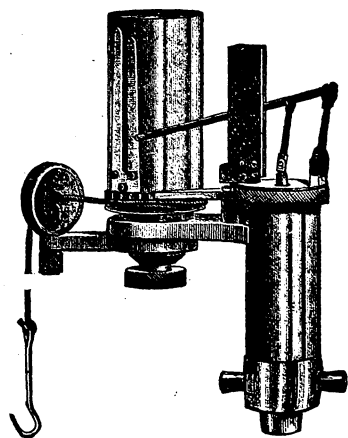
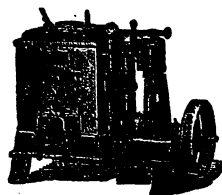


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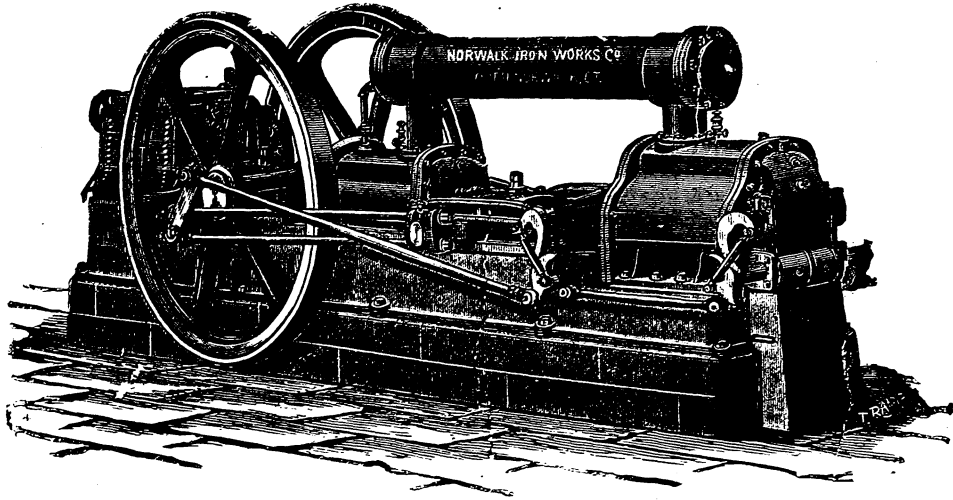
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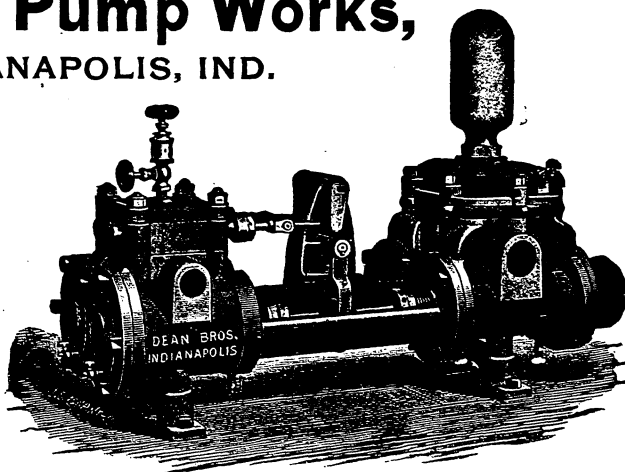
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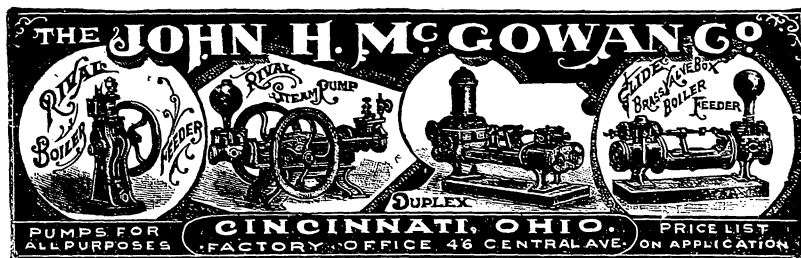
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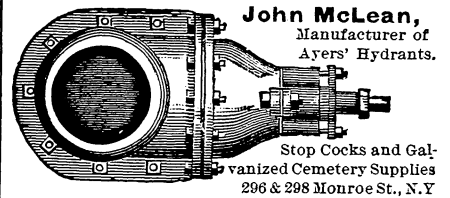
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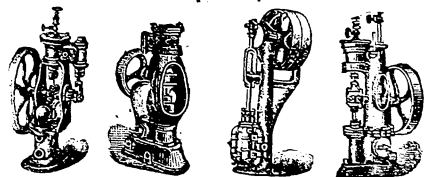
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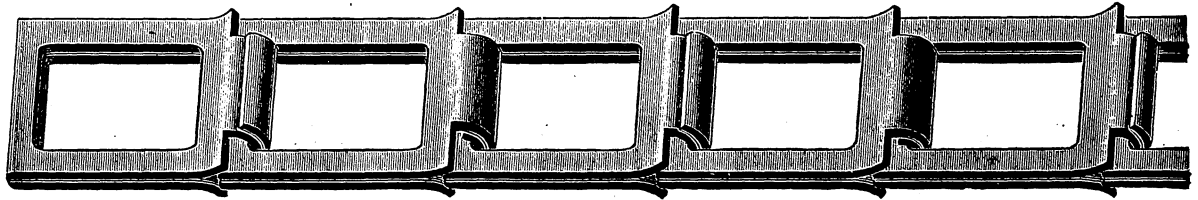
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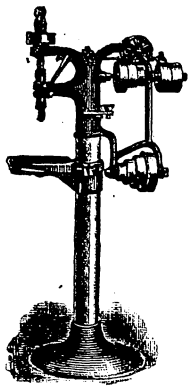
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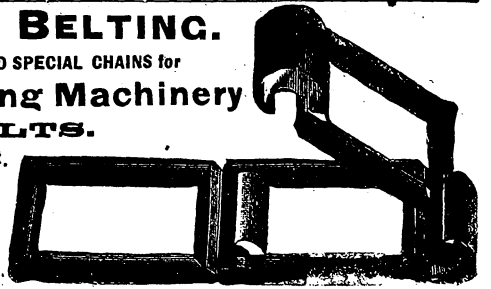
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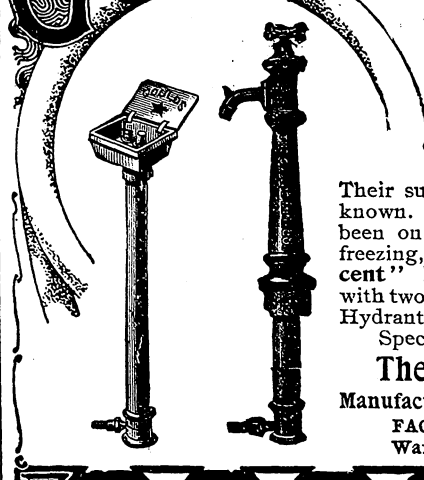
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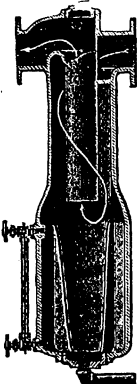
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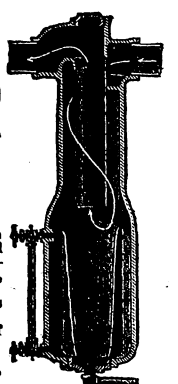
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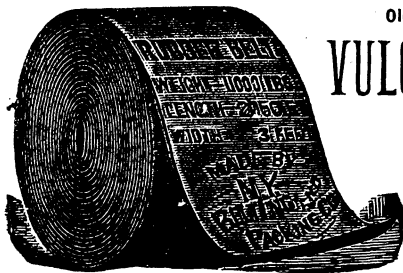
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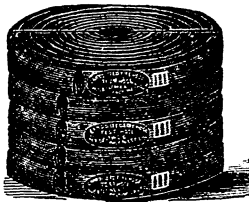
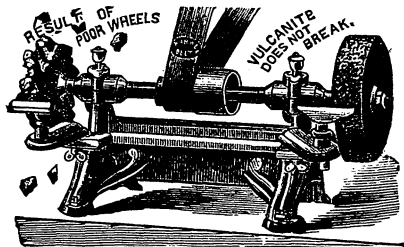
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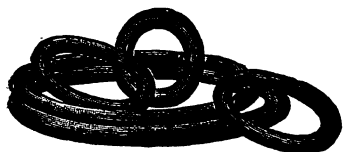
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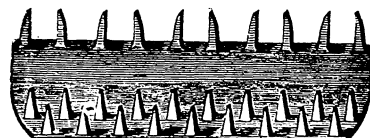
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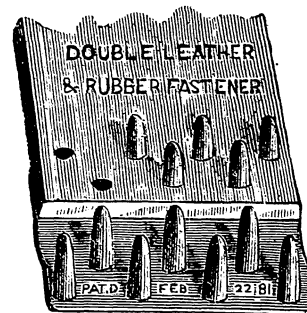
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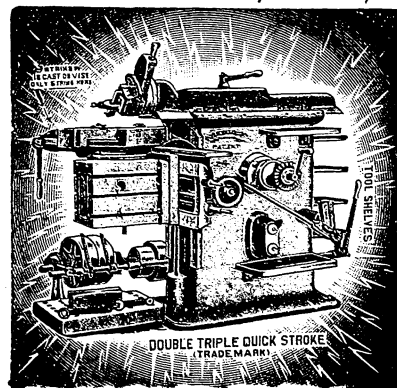
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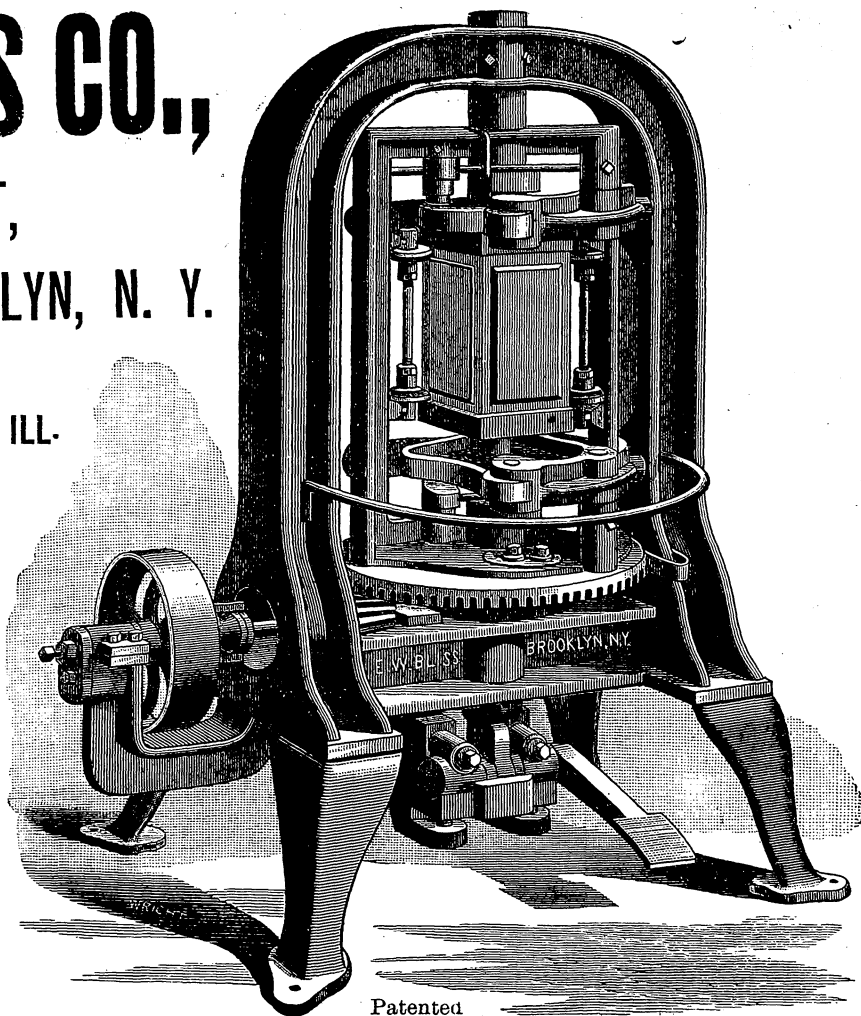
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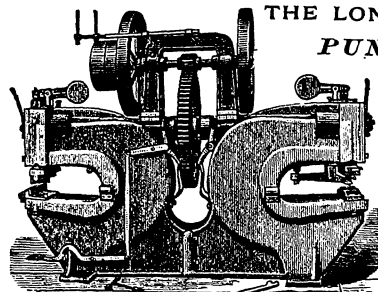
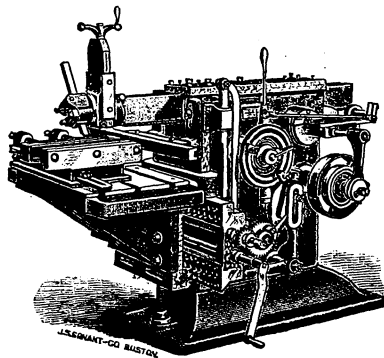
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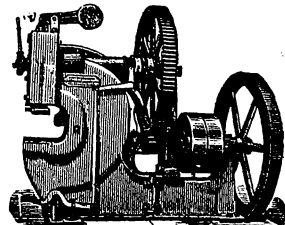


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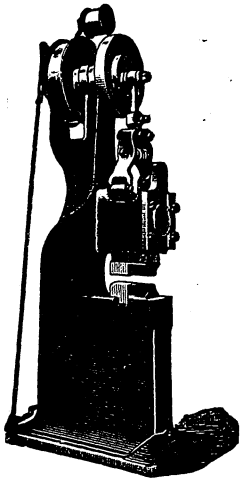
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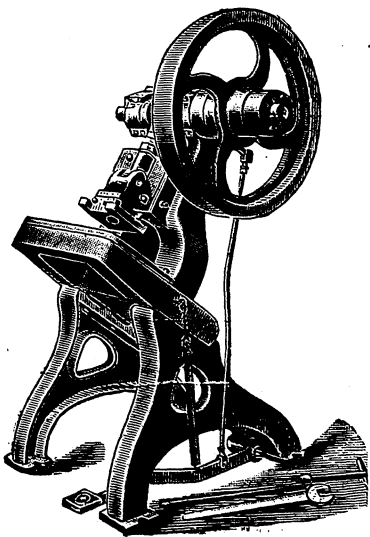
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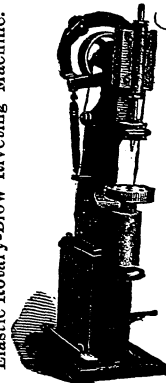
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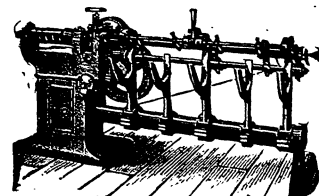
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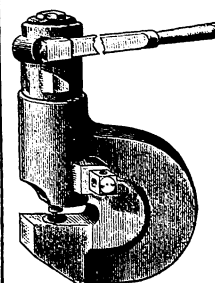
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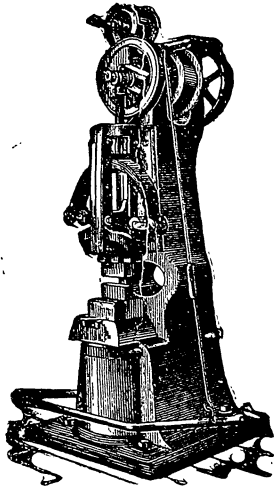
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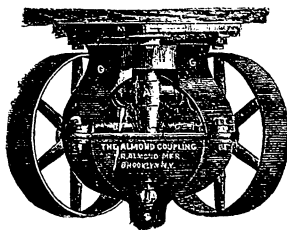
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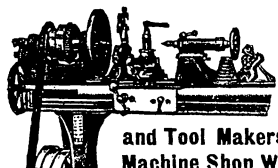
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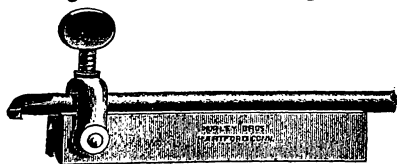


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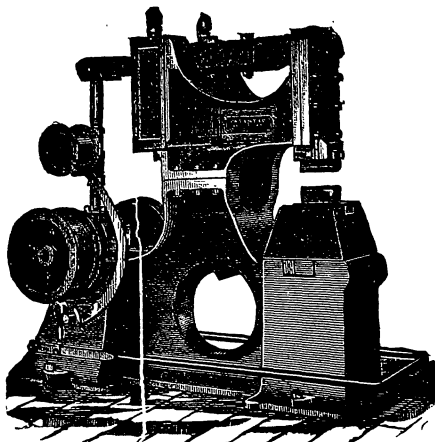
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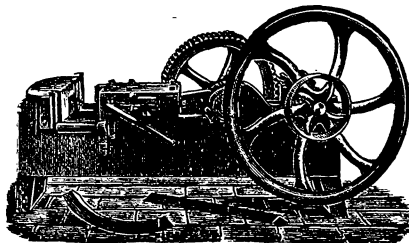
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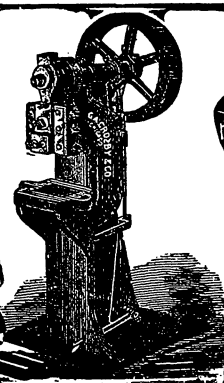
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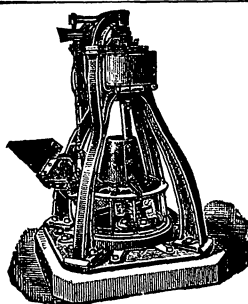


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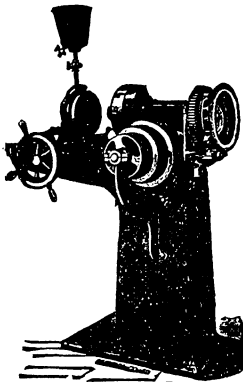
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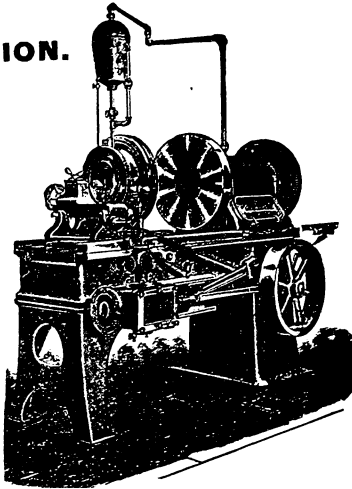
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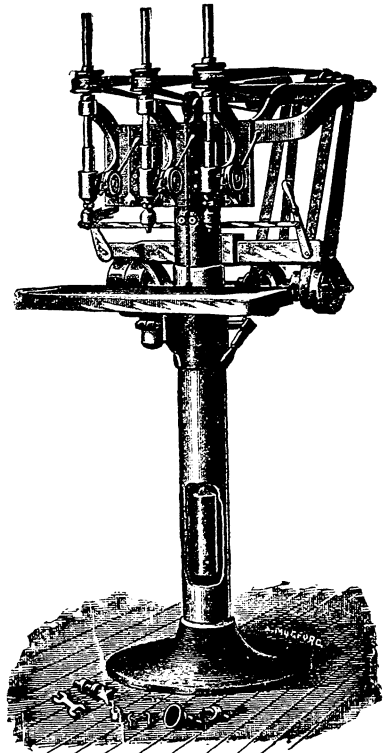


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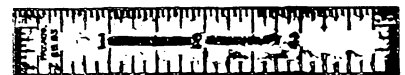
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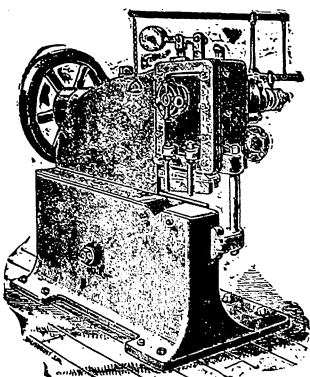


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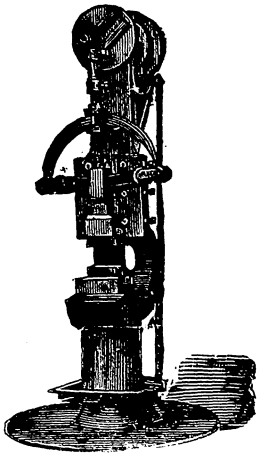


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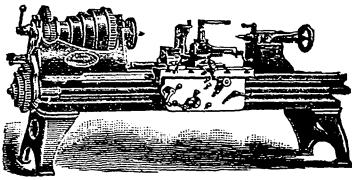


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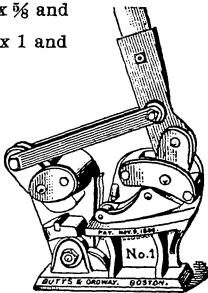
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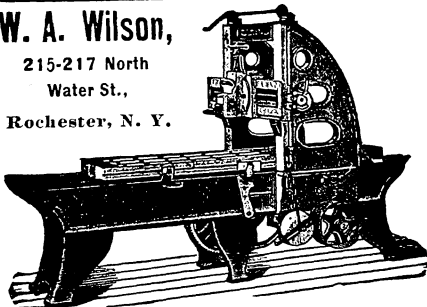
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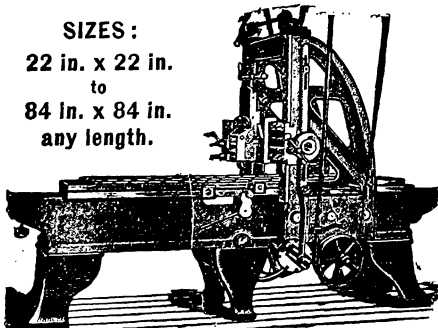
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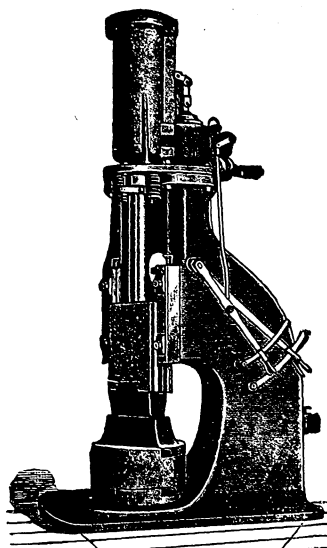
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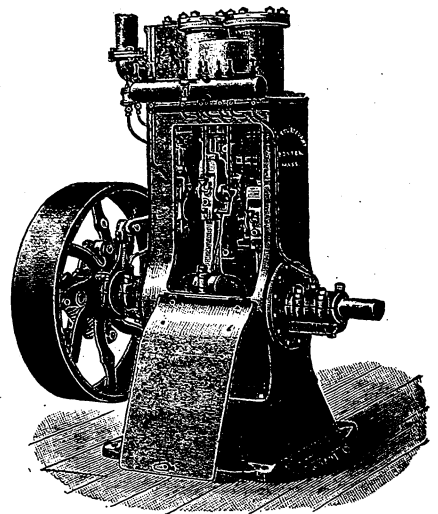
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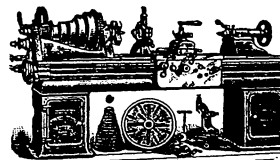
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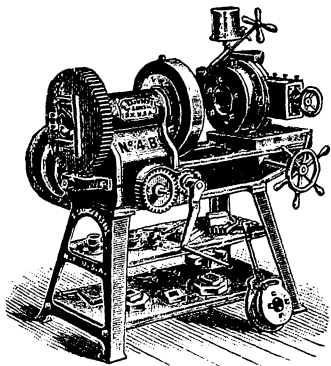
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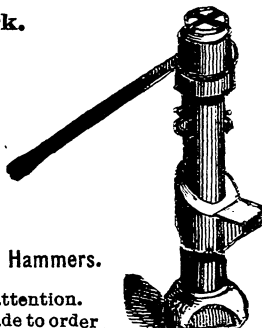
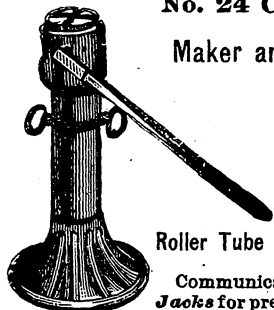
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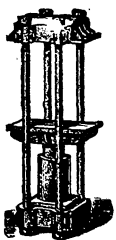
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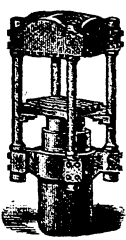
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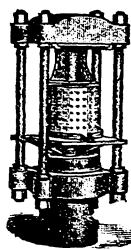
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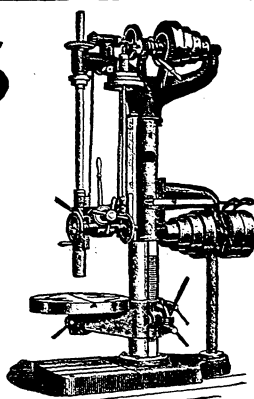
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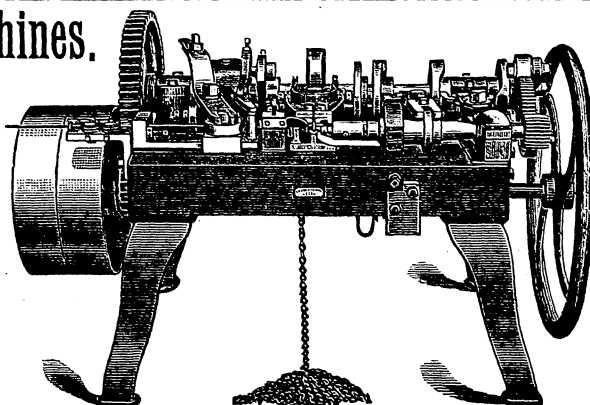
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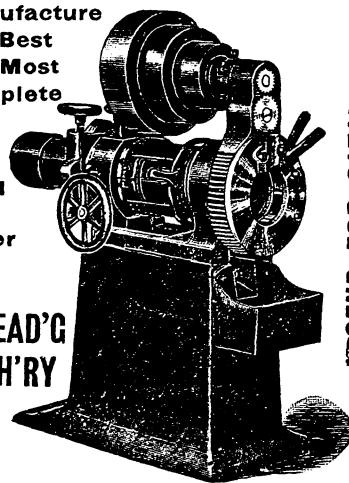


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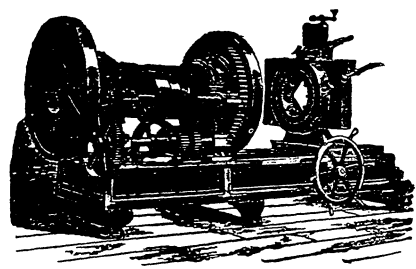
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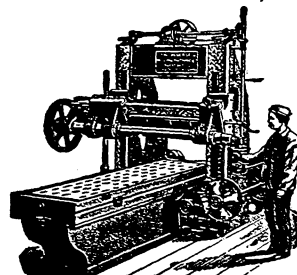
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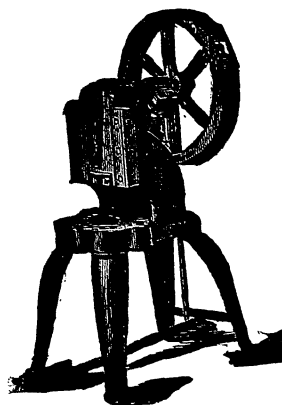
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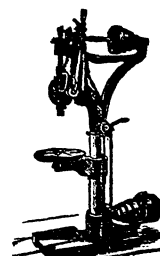
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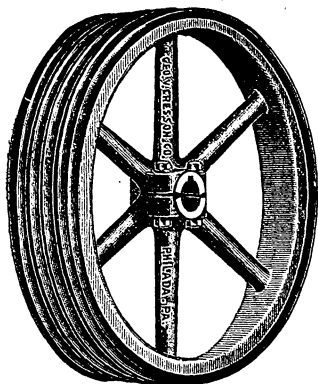
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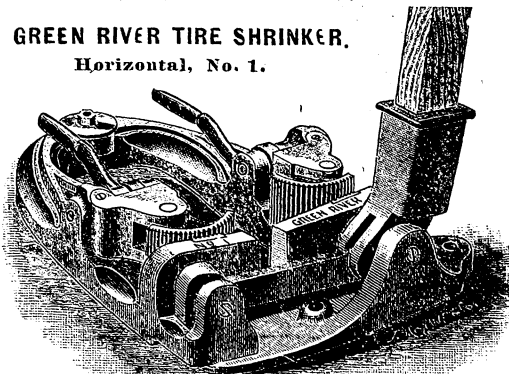
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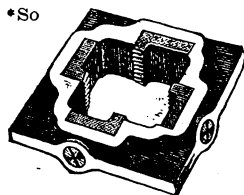
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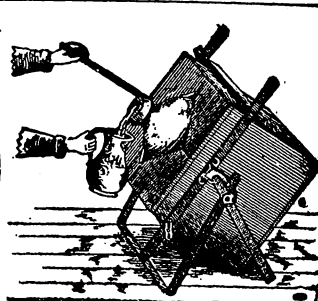
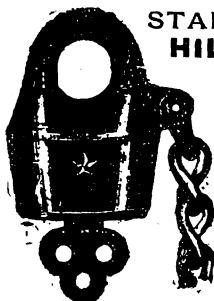
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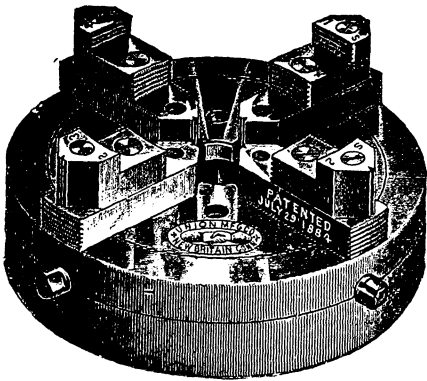
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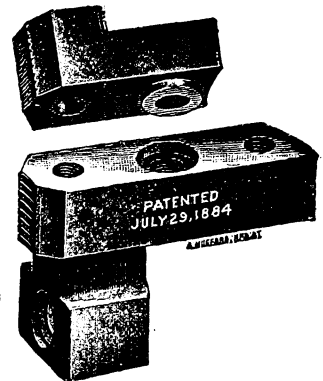
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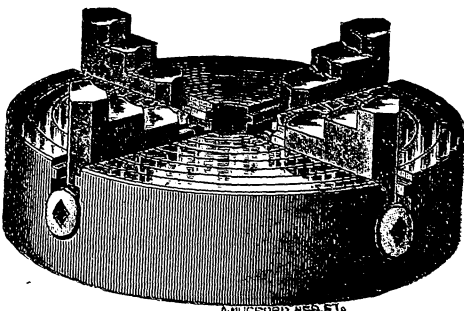
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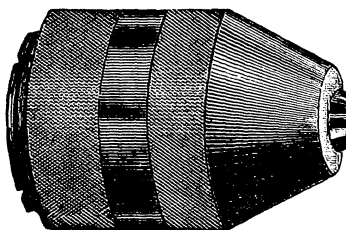
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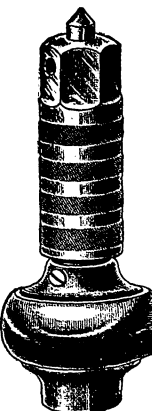
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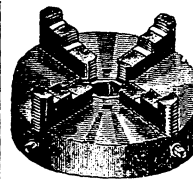
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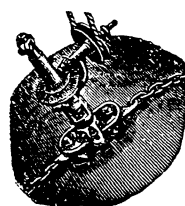
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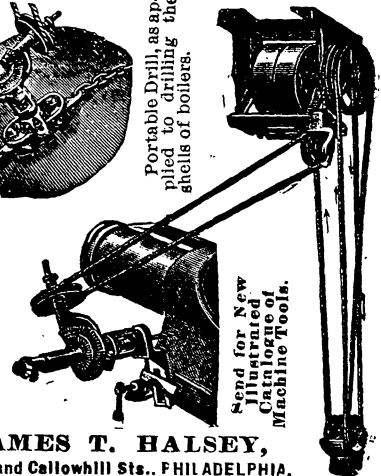
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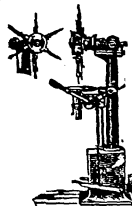
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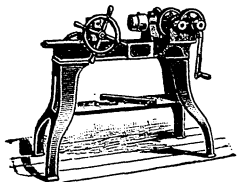
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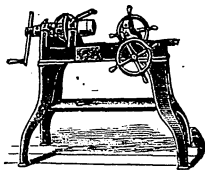
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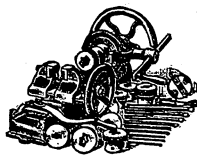
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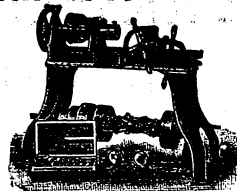
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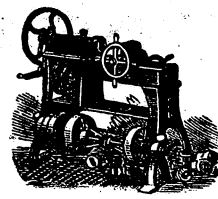
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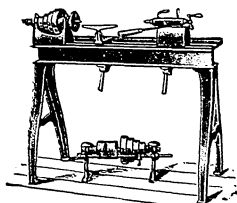
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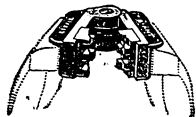


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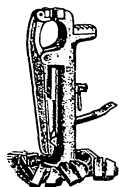
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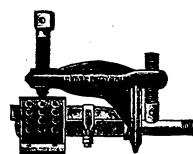


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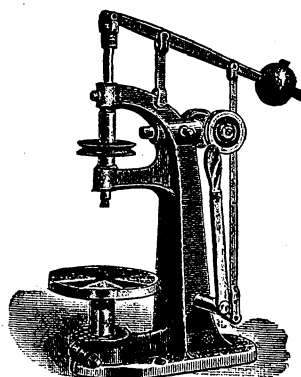
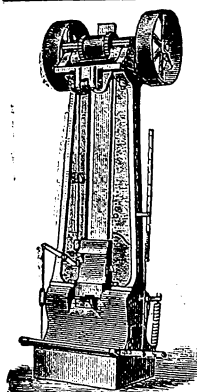
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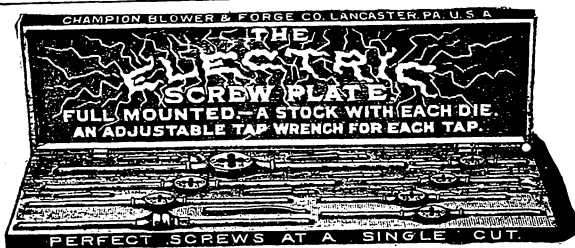


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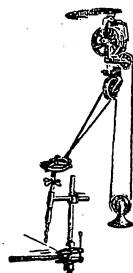
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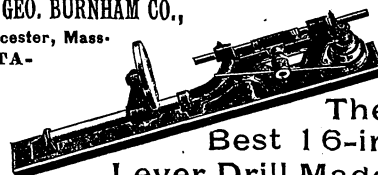
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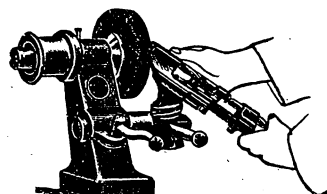
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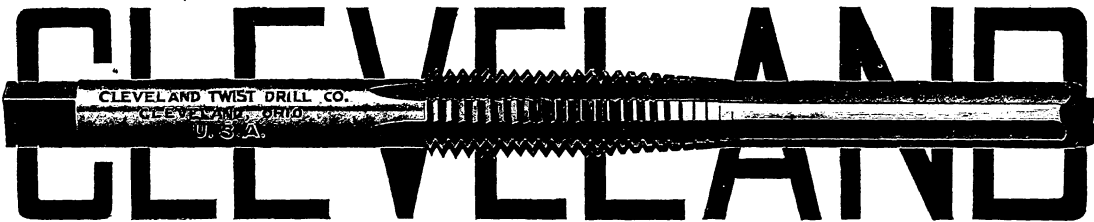
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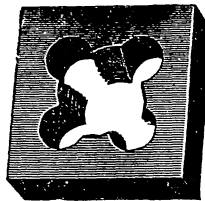
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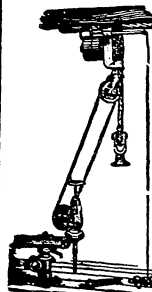
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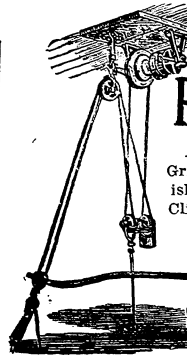
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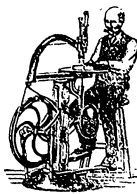
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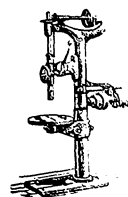
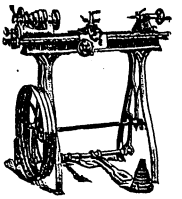


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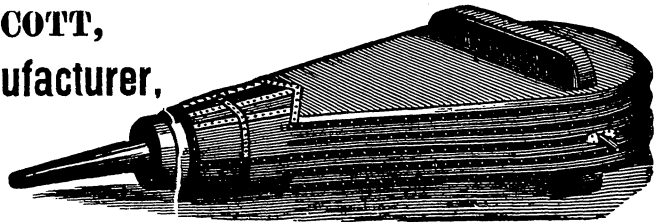
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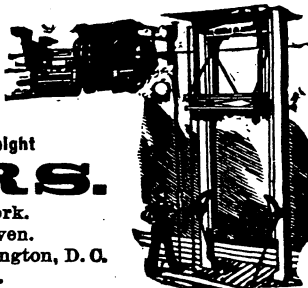
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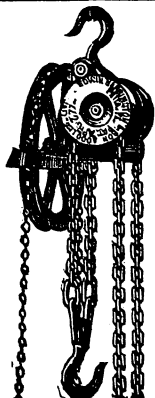
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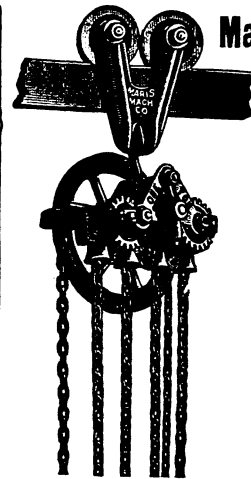
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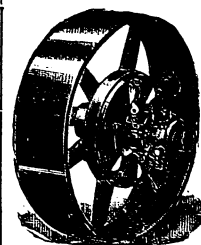
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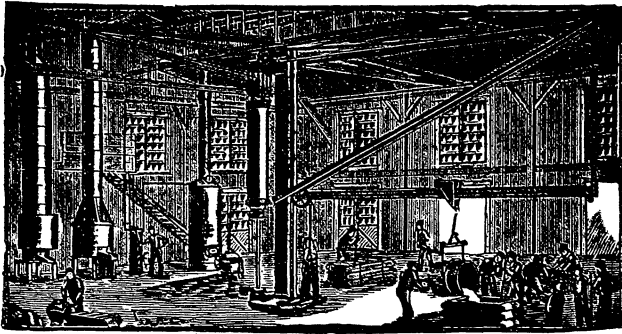
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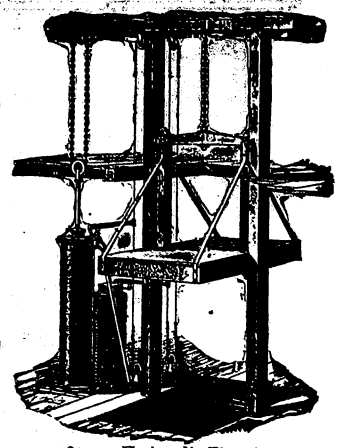


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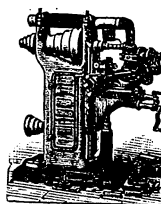
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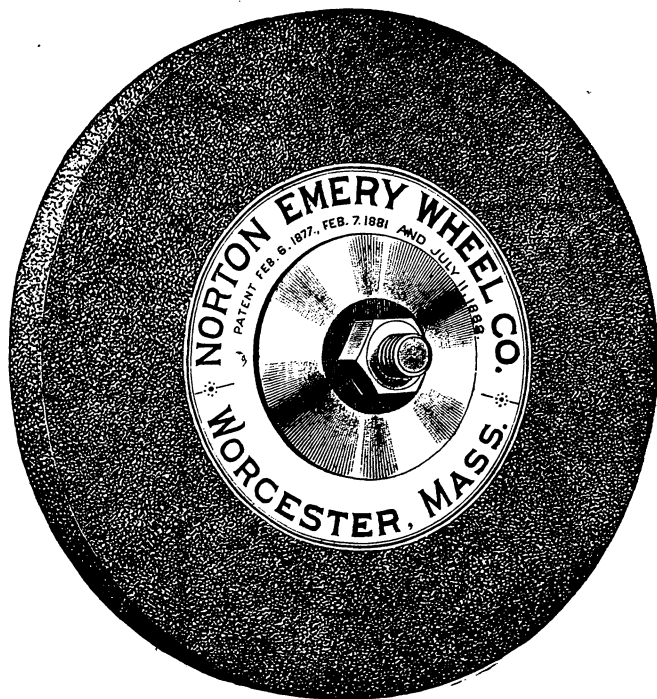
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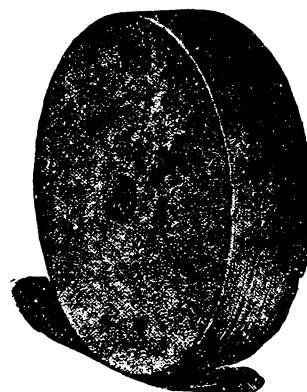
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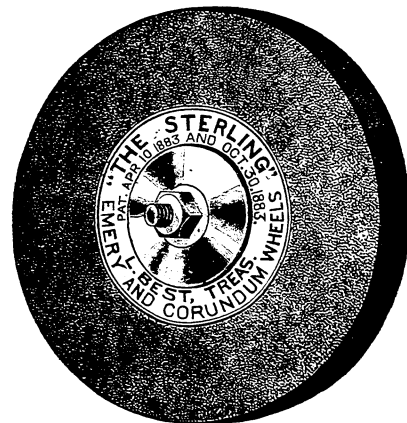


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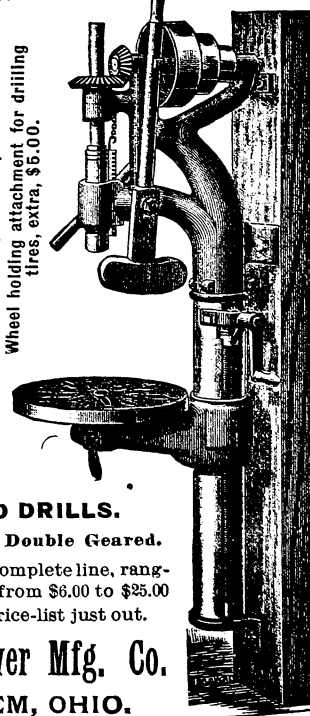
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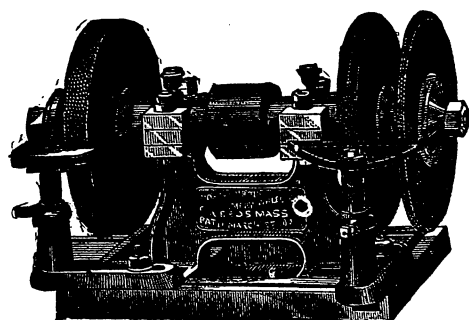


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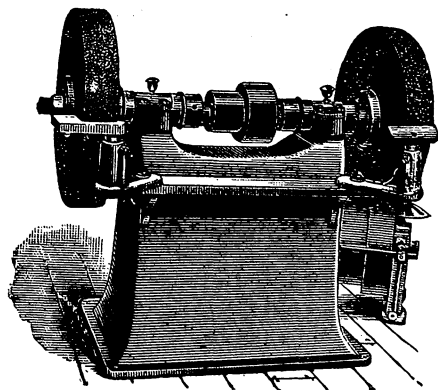
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ASSIGNEE'S SALE.—The undersigned, Assignee of the Roelker Stove and Plow Co., of Evansville, Indiana, by order of the Superior Court of Vanderburgh County, Indiana, will, on the SIXTH DAY OF SEPTEMBER, 1893, on the premises of said company, on Main and Sycamore streets, between Fifth and Sixth streets, commencing at 10 o'clock a.m., and continuing until all said property is disposed of, sell all the real and personal property of said corporation, consisting of stoves, castings, patterns, flasks, tinner's stock, raw material for the manufacture of stoves and plows; also all tools and machinery used in the manufactory. The above property will be sold for CASH.

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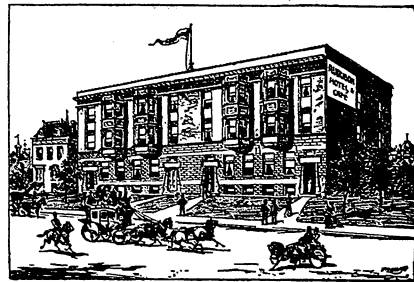
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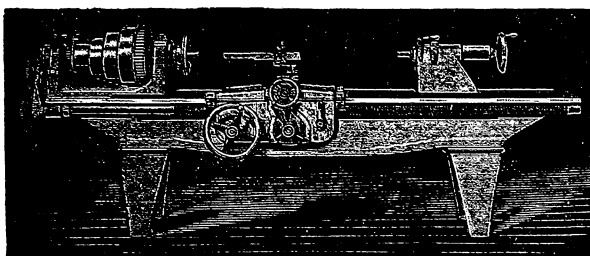
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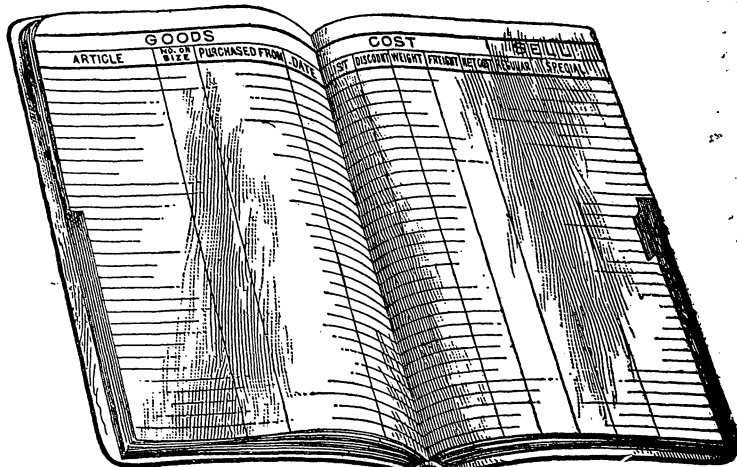
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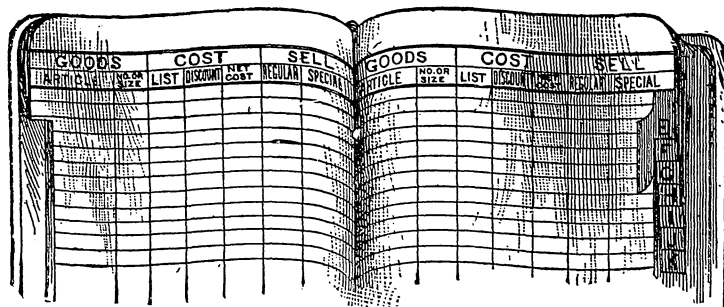
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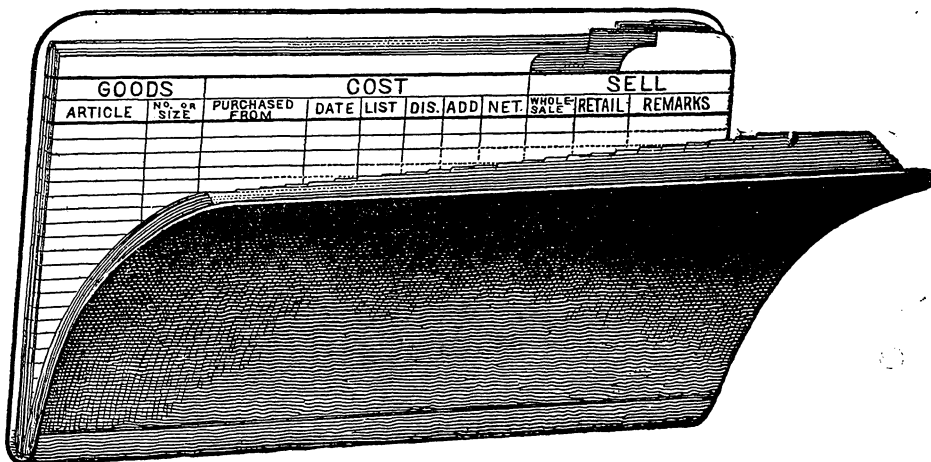
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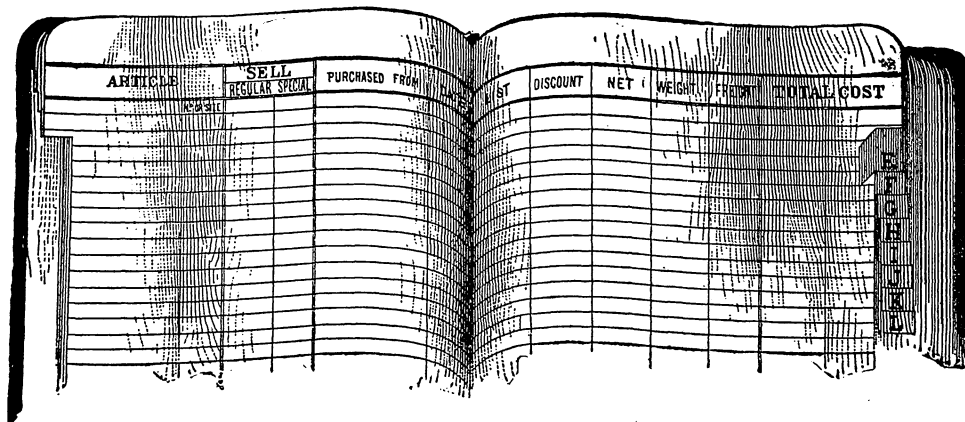
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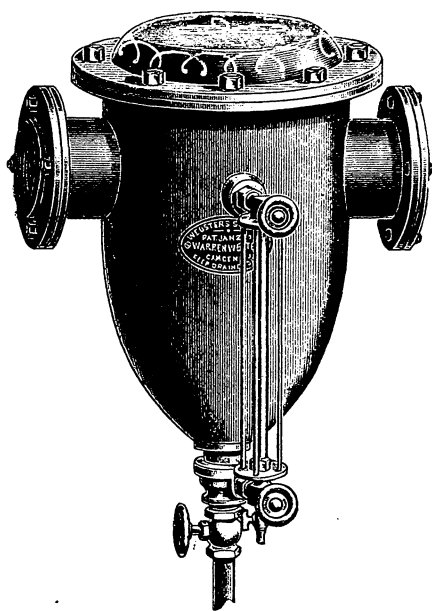
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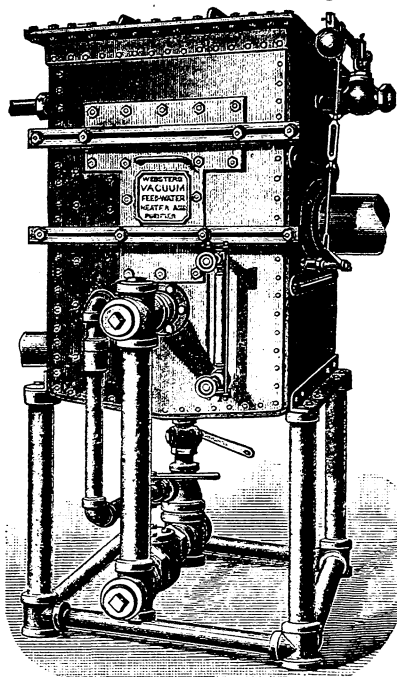
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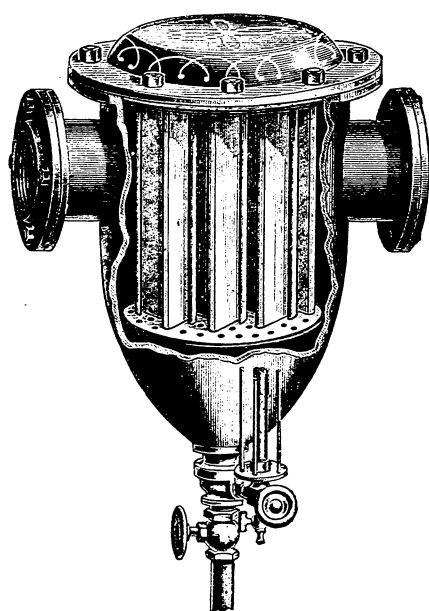
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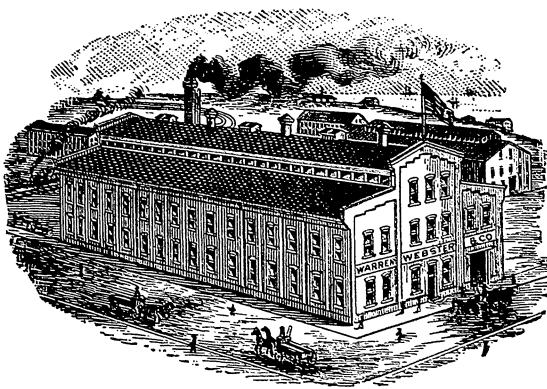
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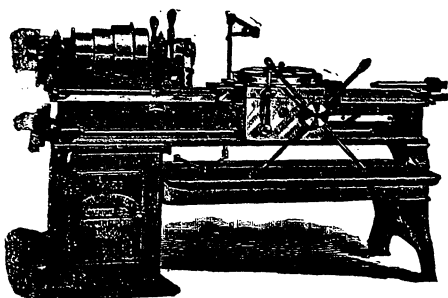
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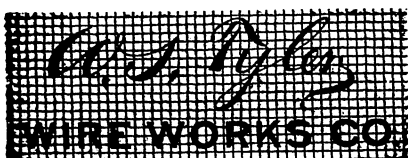
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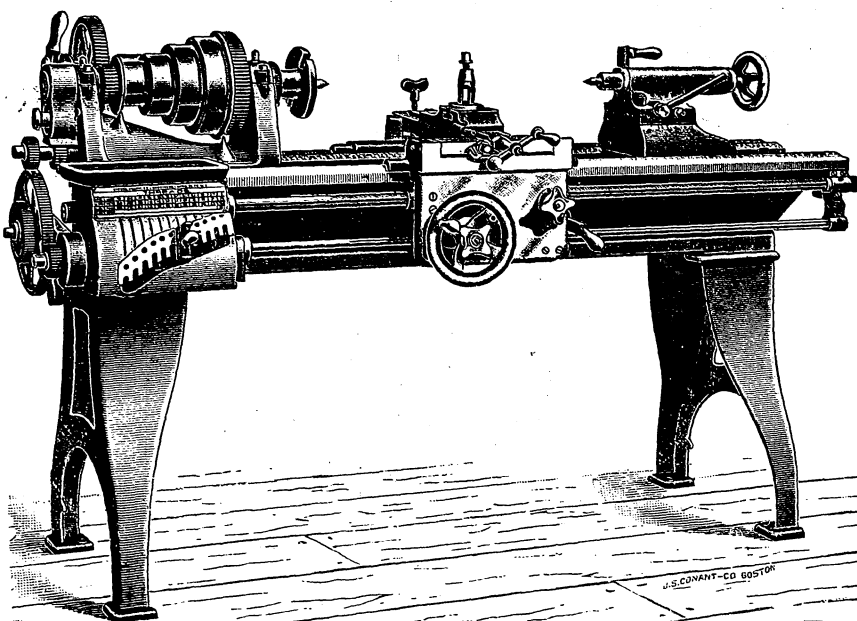
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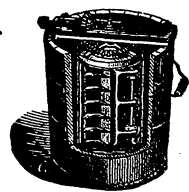
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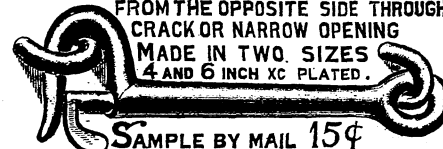


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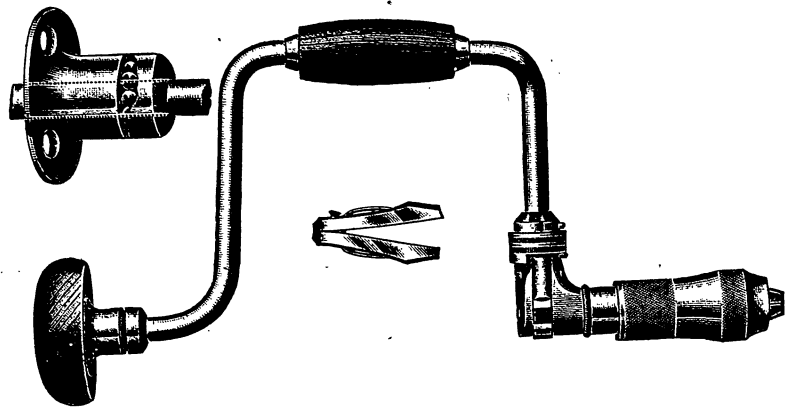
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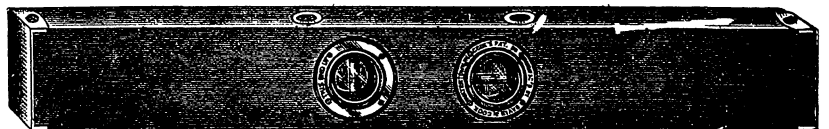
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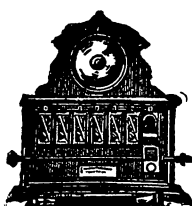
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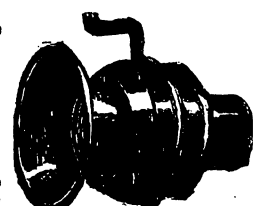


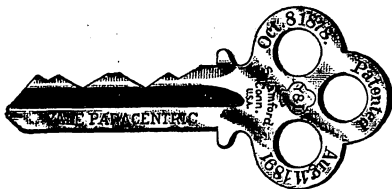
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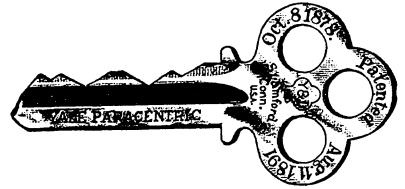
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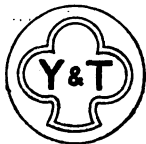




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Glue, And the people are right.

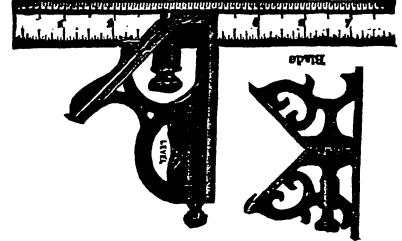
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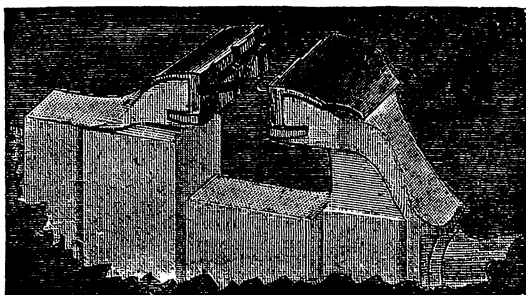
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For protecting finished work. Will
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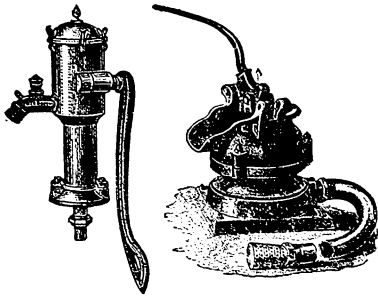
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Fig. 209.

Fig. 381.

Fig. 145.



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The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

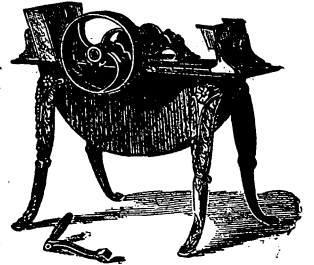
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from 3,000 to 4 500 gallons per hour.

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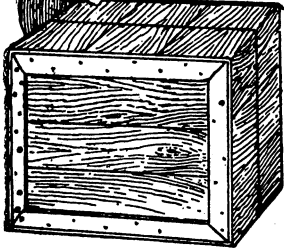
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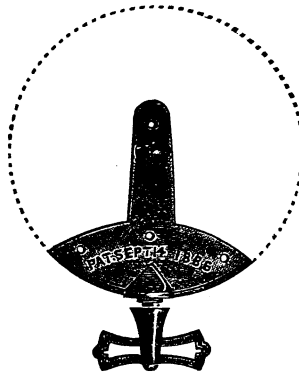
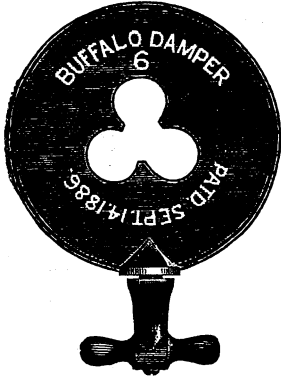
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CHAIN PUMPS,
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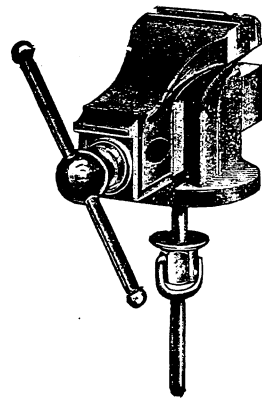
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They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle.

Tubing weighs less than 1/2 lb. per ft., is connected by couplings and can be attached to any make of curb.

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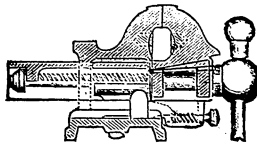
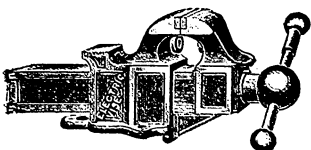
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IT HAS QUALITIES THAT ARE UNDISPUTED.

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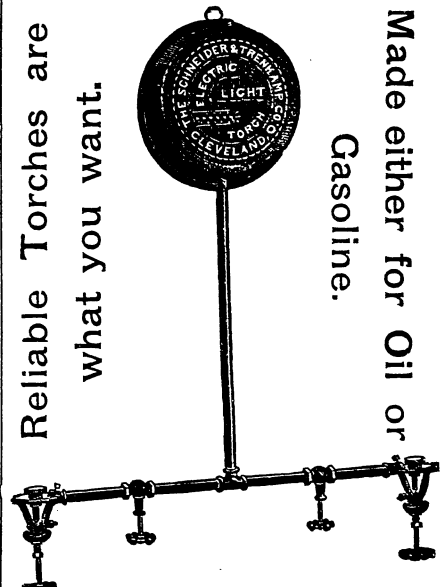
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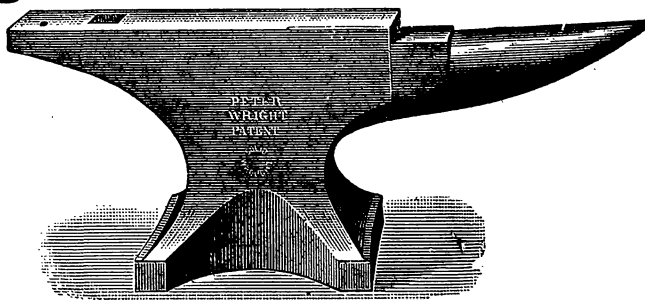
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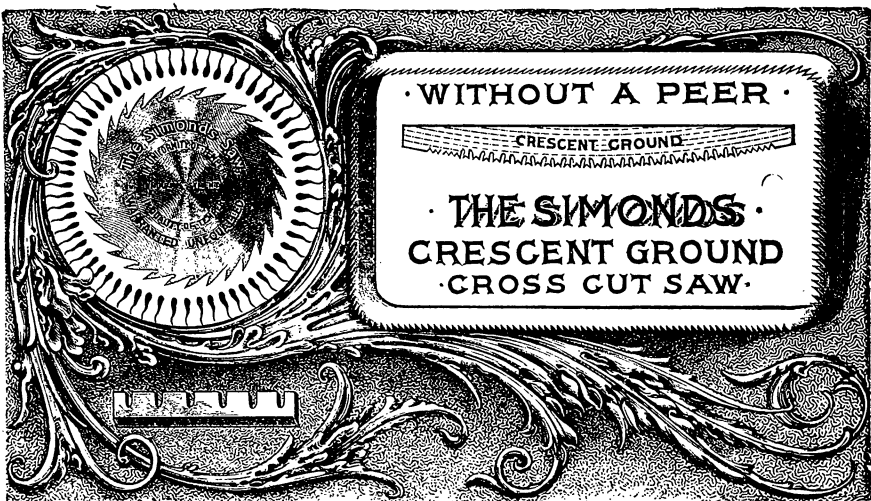
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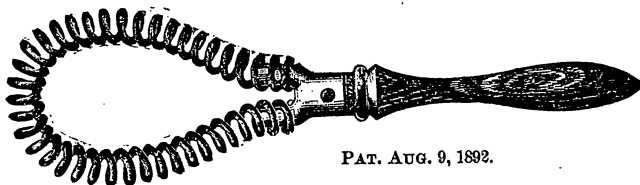
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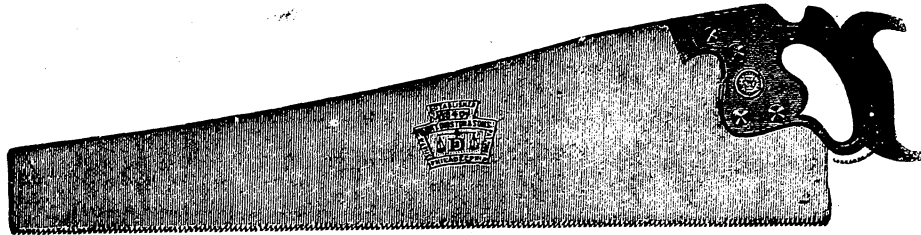
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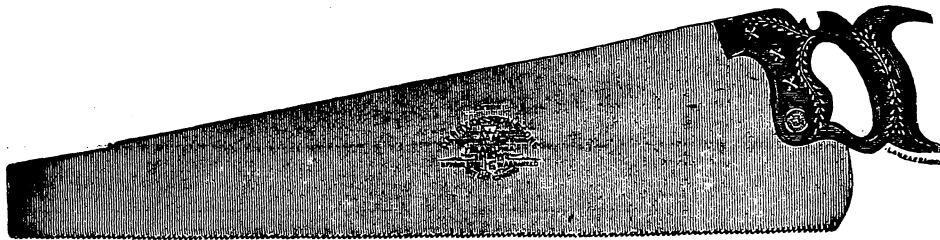
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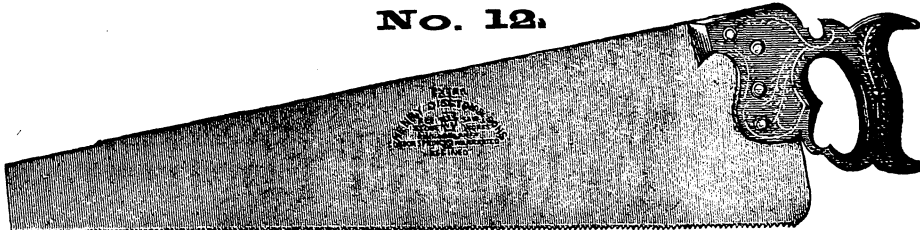
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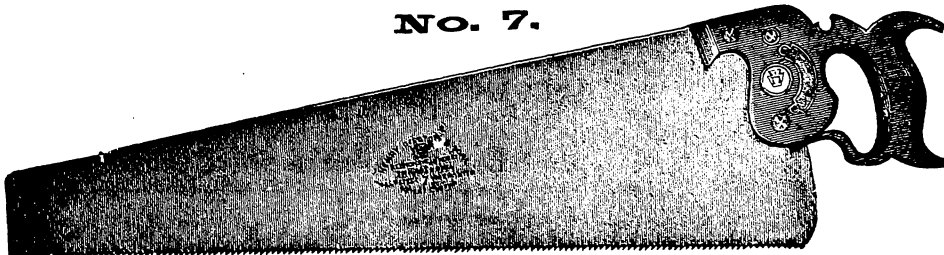
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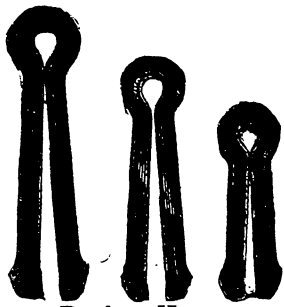
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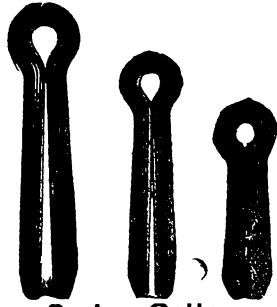
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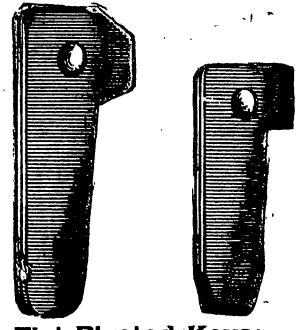
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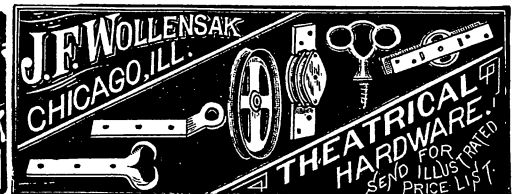
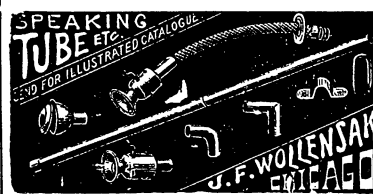
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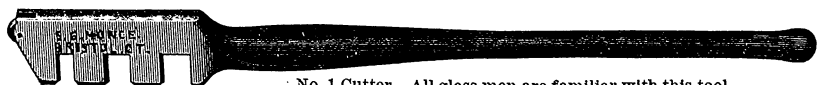
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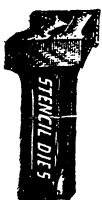


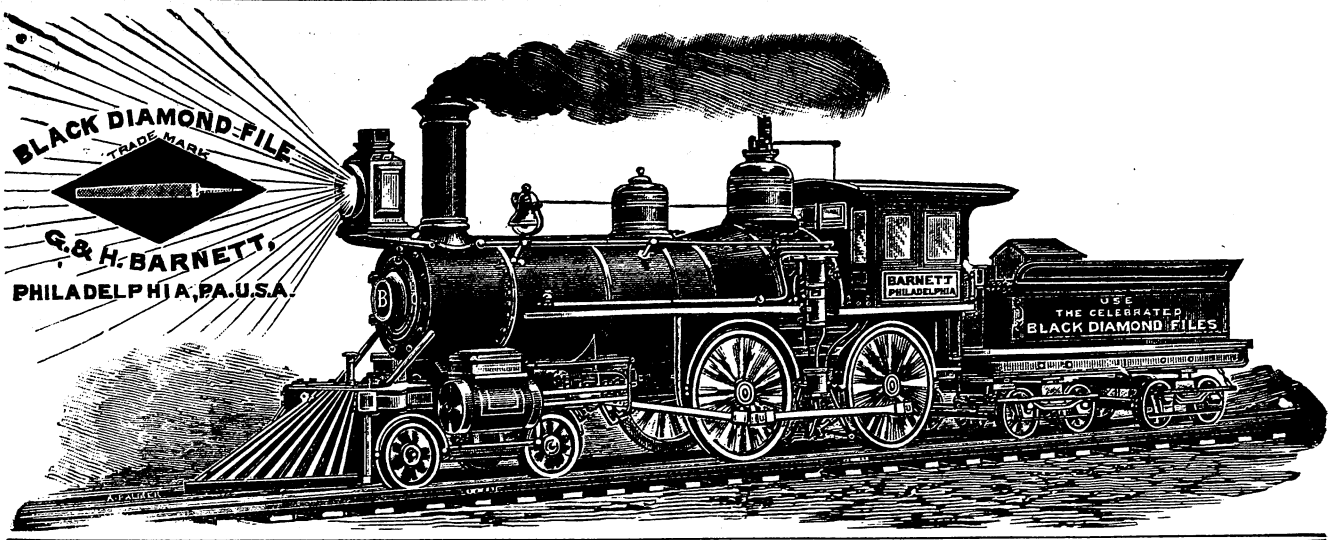
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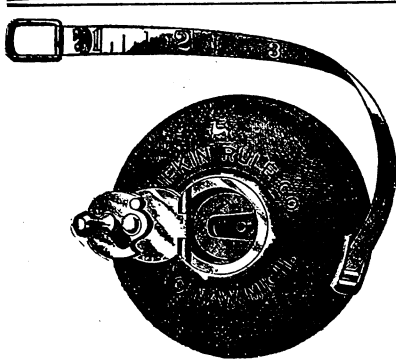
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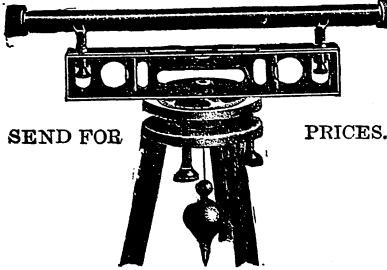


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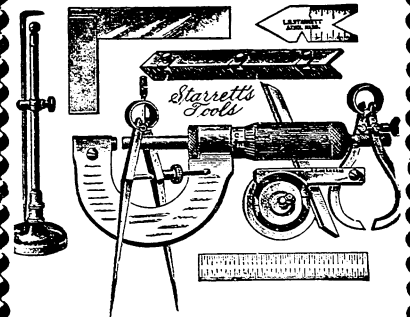
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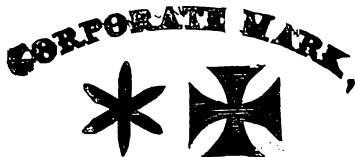
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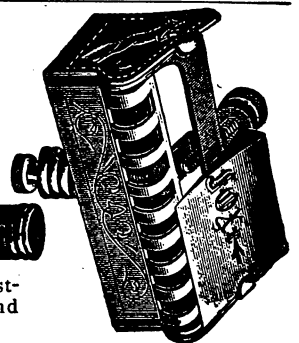
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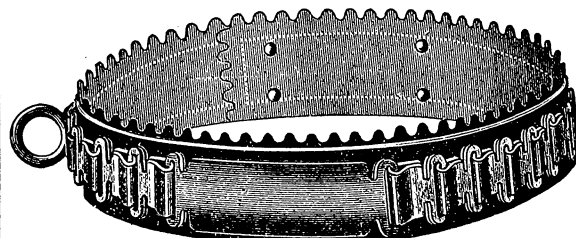
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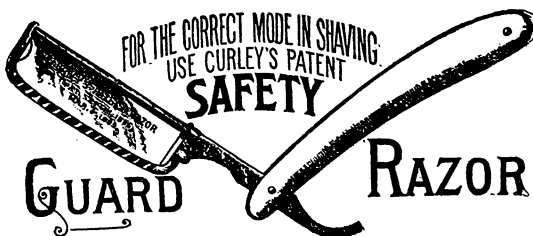
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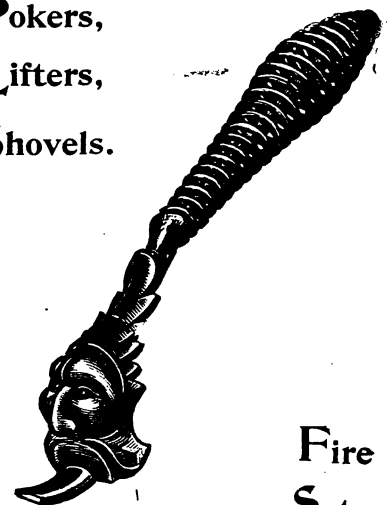
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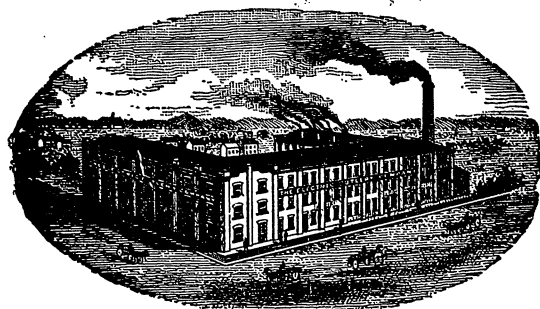
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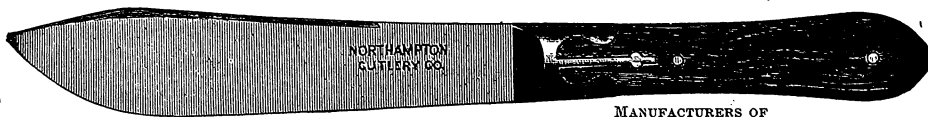
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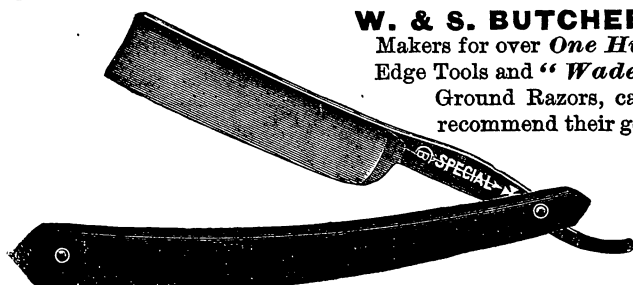
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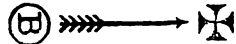
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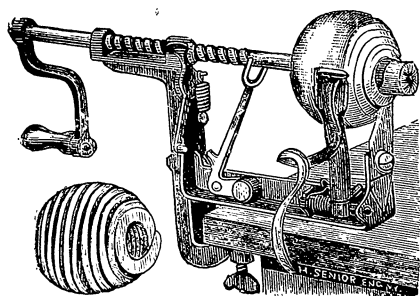
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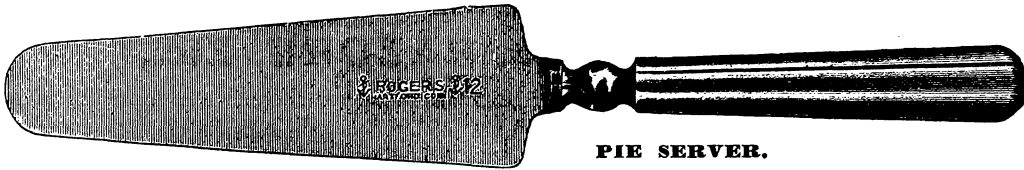
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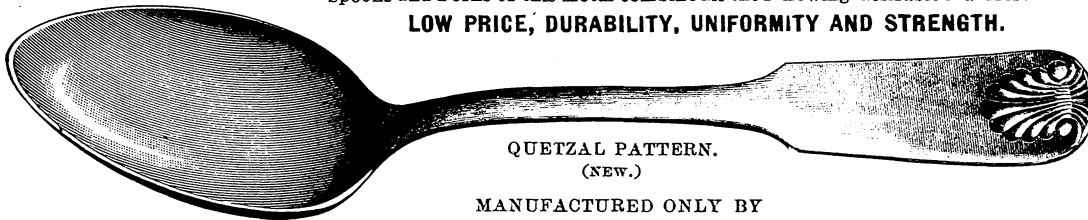
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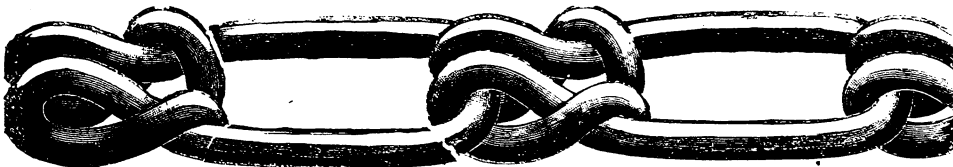


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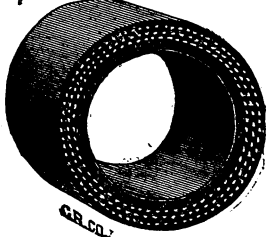
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Chain, made into Halters
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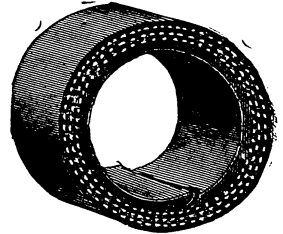
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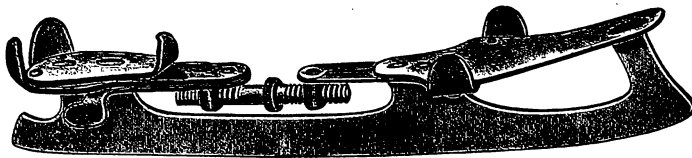
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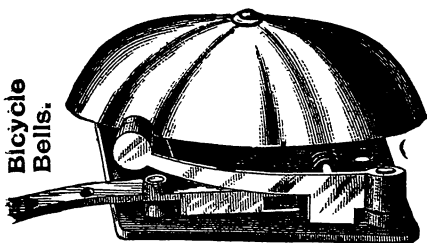
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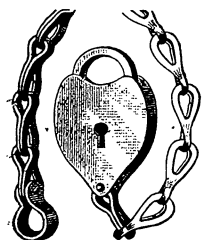
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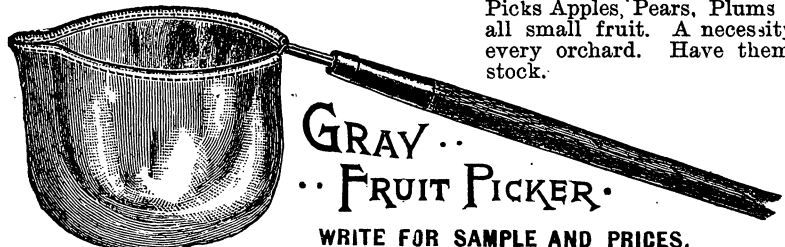


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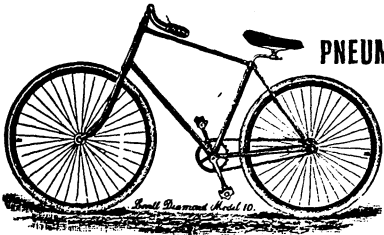
CONTENTS.—Wiring, Soldering and Joining Wires and Earth Connections. Pushes, Pulls, Contacts and Switches. Bells, Relays and Indicators. Batteries. The Magneto Bell. Connecting-up. The Detector and Localizing Faults. Portable Sets. Index.

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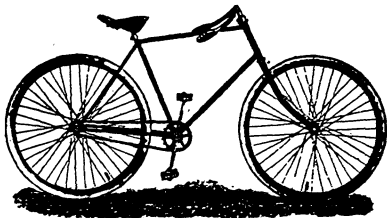
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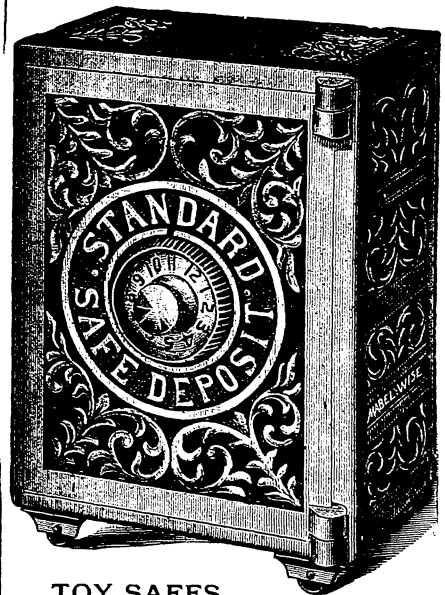
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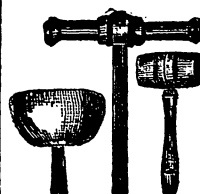
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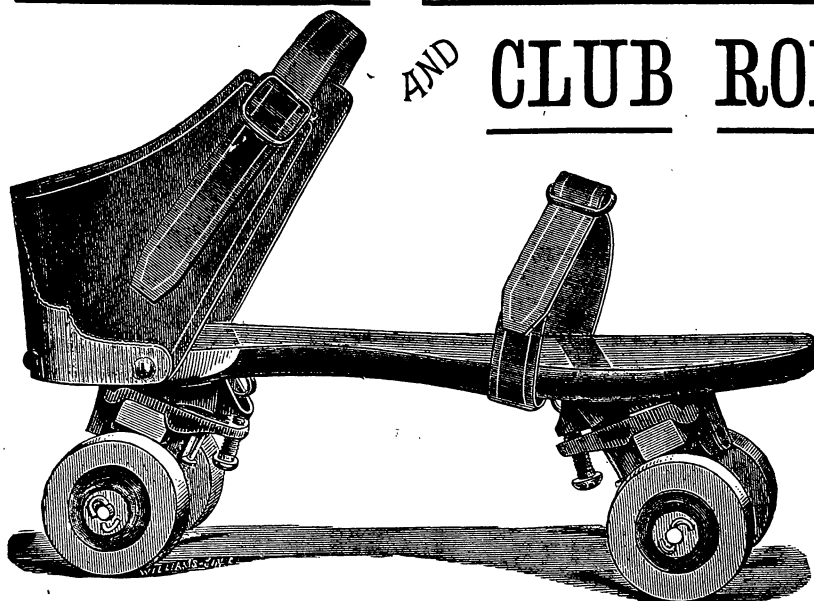
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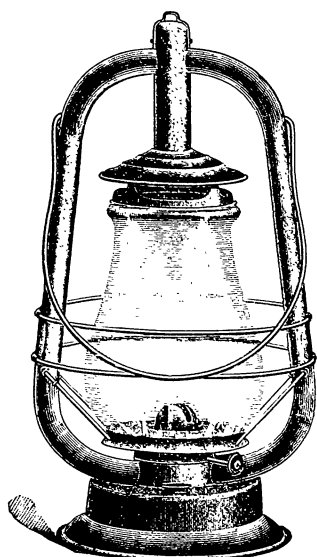
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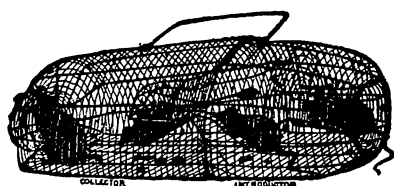
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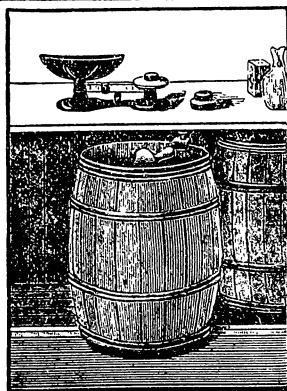


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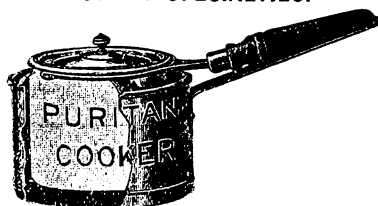
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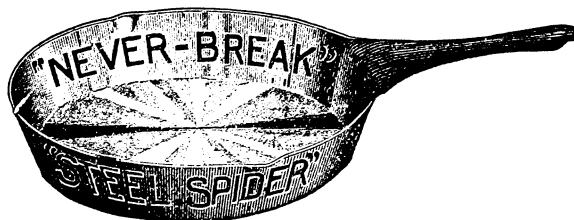
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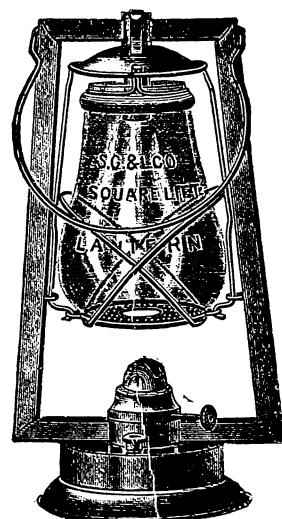
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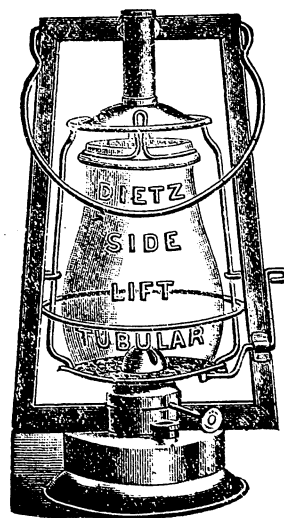
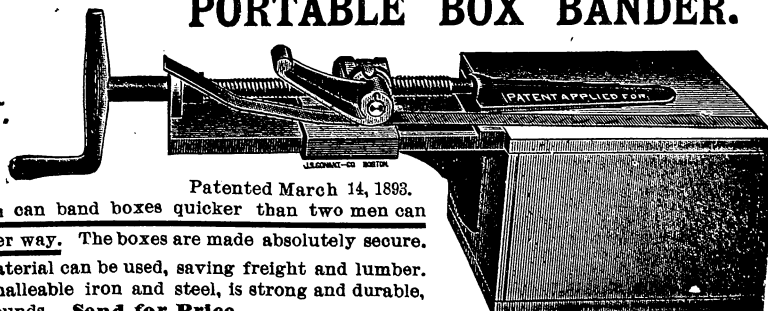
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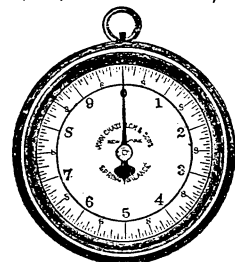
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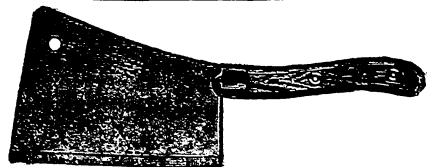
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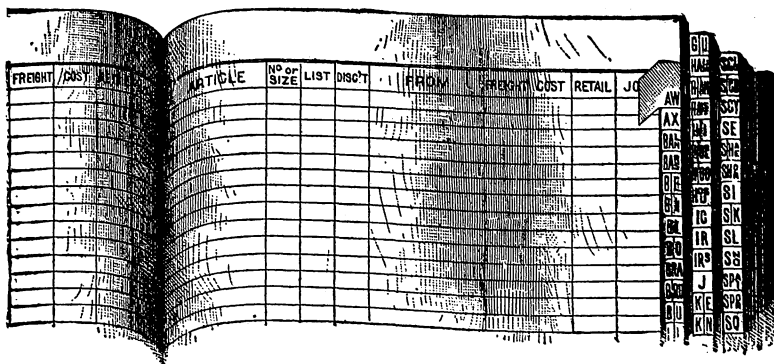
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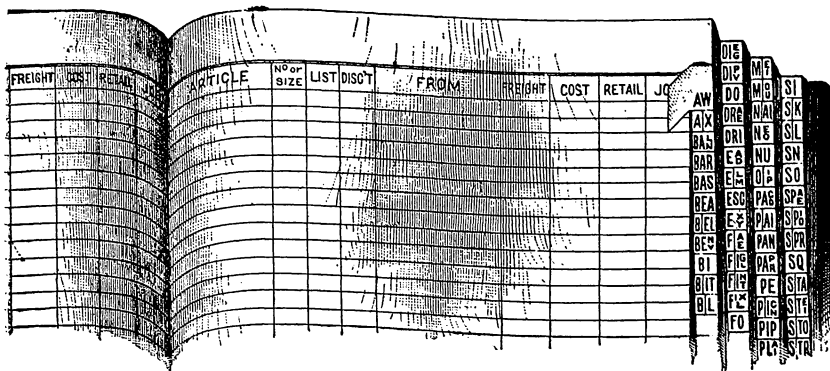
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THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$5.00.

The Iron Age Hardware Price Book F.

WITH MULTIPLE INDEX (Patent Pending).



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AW DR_E N₅ SN
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For Augers,	turn to	AU	For Chisels,	turn to	CH ₁	For Iron,	turn to	IRO
" Parers, Apple	"	PA _R	" Cutlery,	"	CUT	" Irons,	"	IR'S
" Saws,	"	SAW	" Cartridges,	"	CAR	" Shovels,	"	SH _R
" Pumps,	"	PUM _N	" Rules,	"	RUL	" Grindstones,	"	GRI
" Bits,	"	BIT	" Locks,	"	LO	" Stones,	"	STO

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

It is, however, obvious if any articles are not directly designated by the index characters, that the index, being alphabetical in its arrangement, indicates the place where quotations on such articles should be recorded. The supplement, however, may be found useful for quotations on any outside goods which the Hardwareman may desire to keep prices on, while at the same time it may be used if necessary for any overflow of matter from the preceding pages, or to contain list prices or other matter relating to goods.

Hardware Classification.—A pamphlet containing a classification of the leading Hardware articles is furnished with the price books.
Standard Lists.—In connection with these price books a set of *The Iron Age* STANDARD HARDWARE LISTS can be used with great advantage. Price 25 cents.

These price books, which have been prepared by R. R. Williams, Hardware Editor of *The Iron Age*, are presented to the attention of Hardware men in the confidence that they will be found a most valuable aid in keeping track of prices.

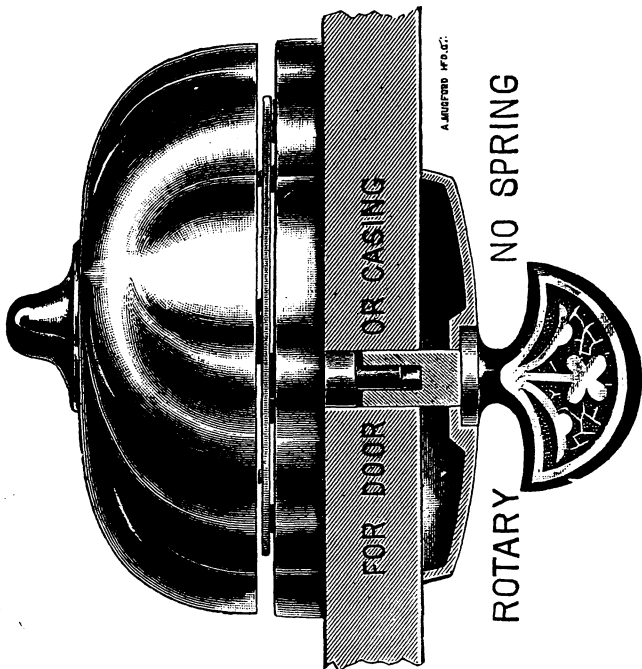
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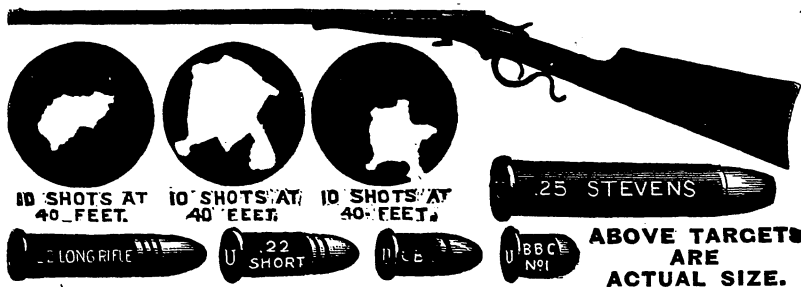
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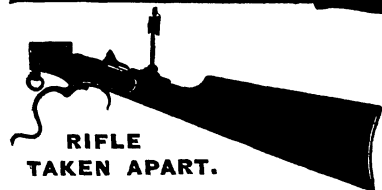
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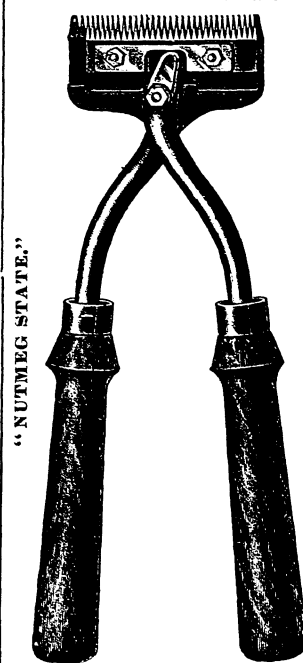
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to a well kept
Lawn.

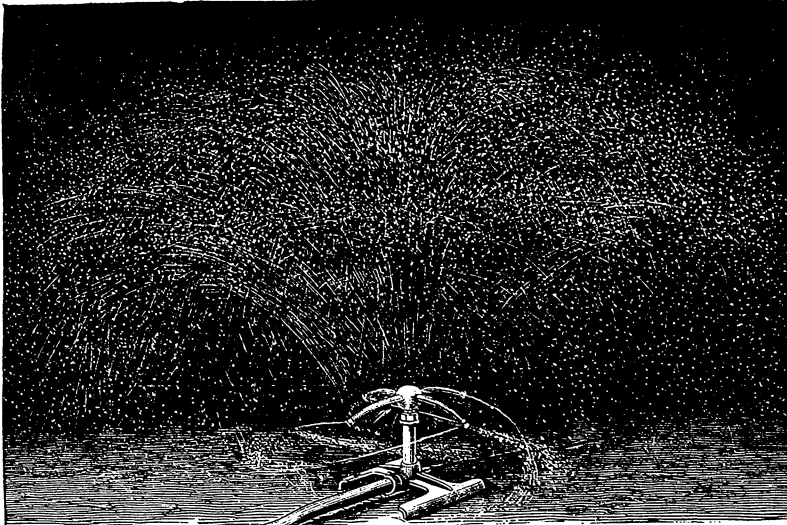
A Sprinkler
which will work
satisfactorily in
spite of muddy
water.

May be easily
moved from
place to place
without going
near it

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ADVANTAGES:

1st. Each machine is furnished with a cord or rope, so that the Sprinkler may be easily moved, when running, without going near it.

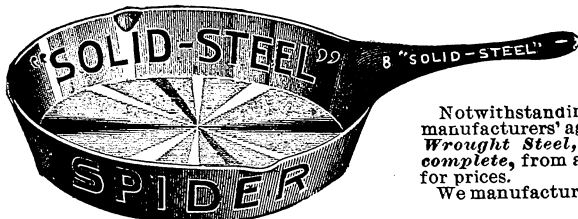
2d. The water passes through a strainer before it enters the small perforations, which are thereby prevented from filling up.

3d. It is so constructed that the weight of its revolving parts is removed by the pressure of the water, thus overcoming unnecessary wear.

4th. All parts of the machine are made sufficiently strong for ordinarily rough usage and are interchangeable.

5th. The machine is TINED and NICKEL PLATED and is of very handsome appearance.

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Made either with Balls or Solid Handles.

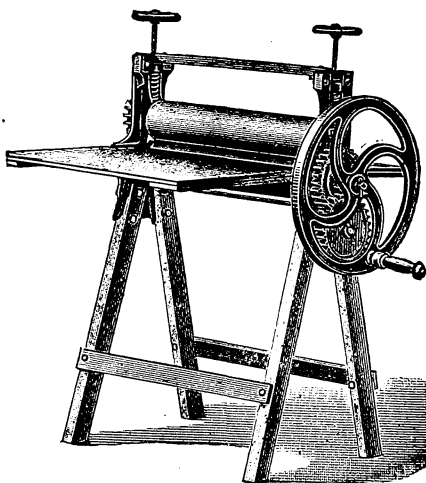
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Keeps the linen whiter.
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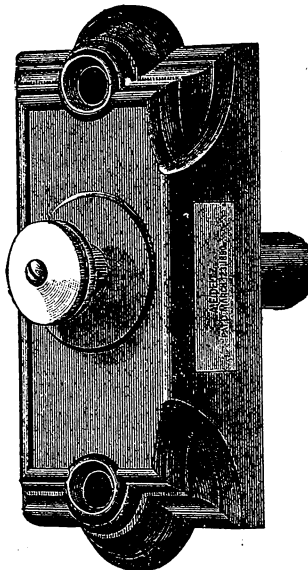


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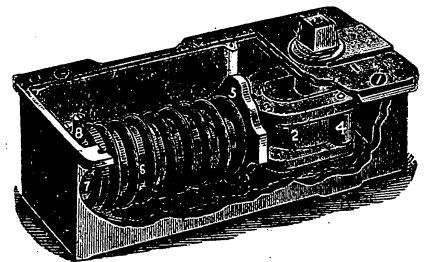


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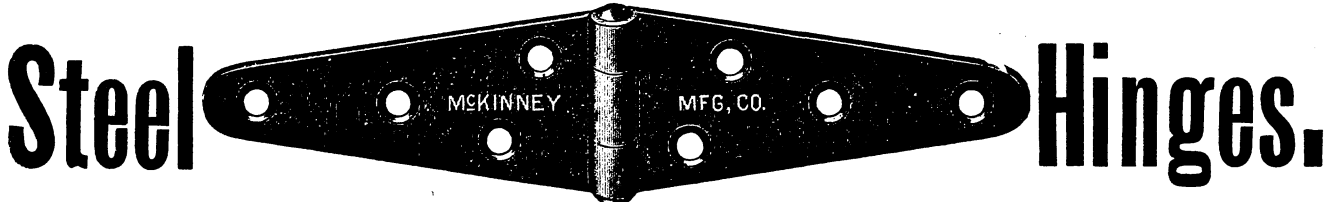
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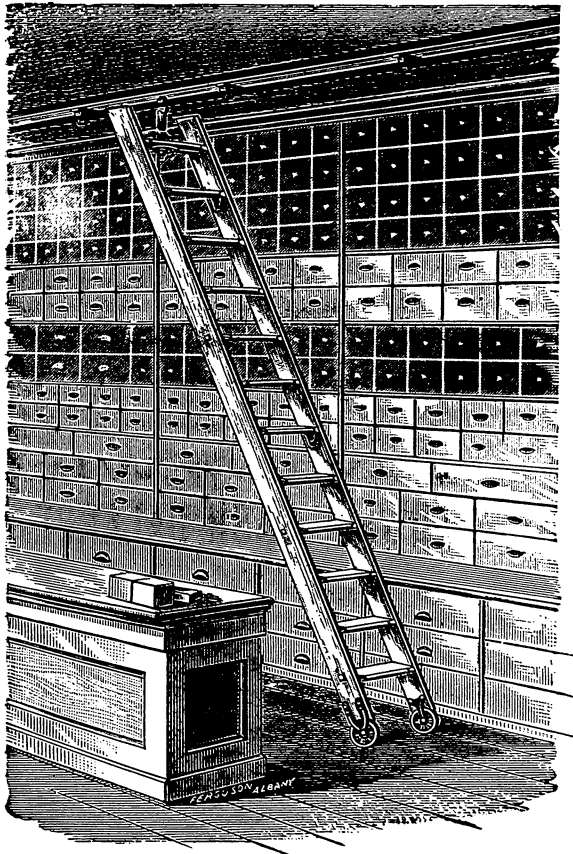
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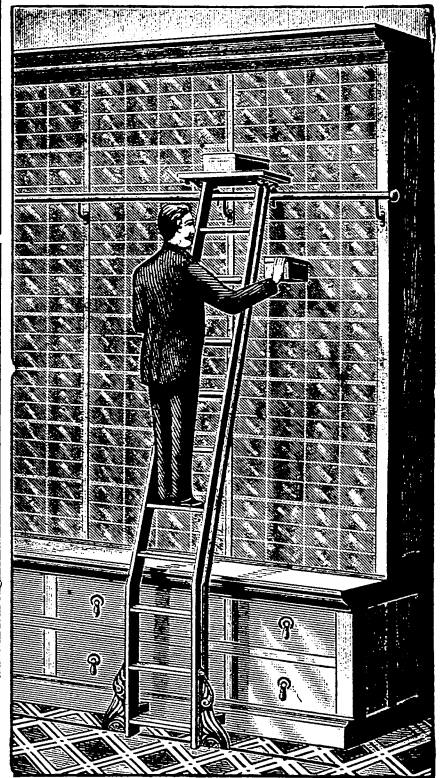
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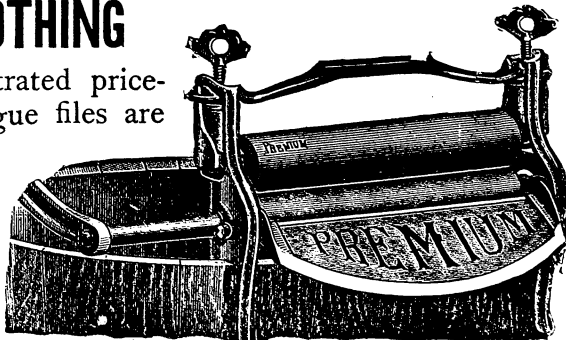
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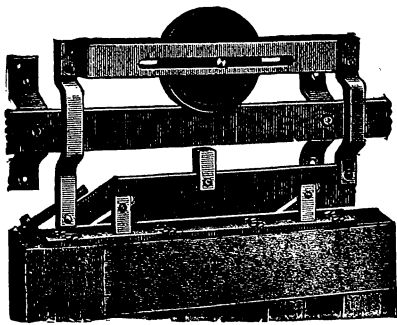
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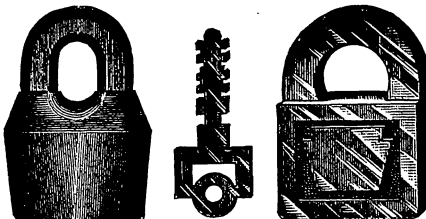
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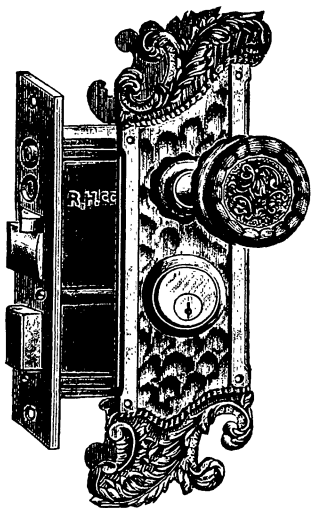


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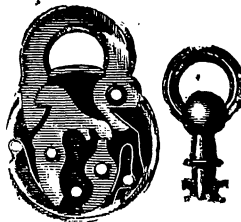
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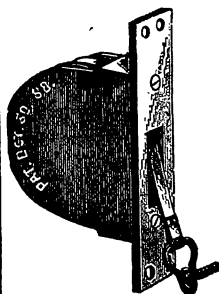
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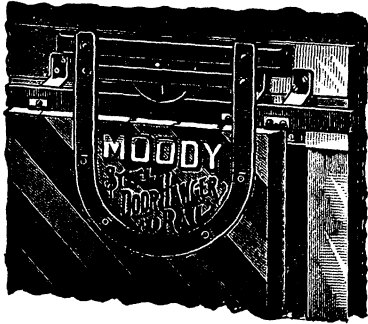
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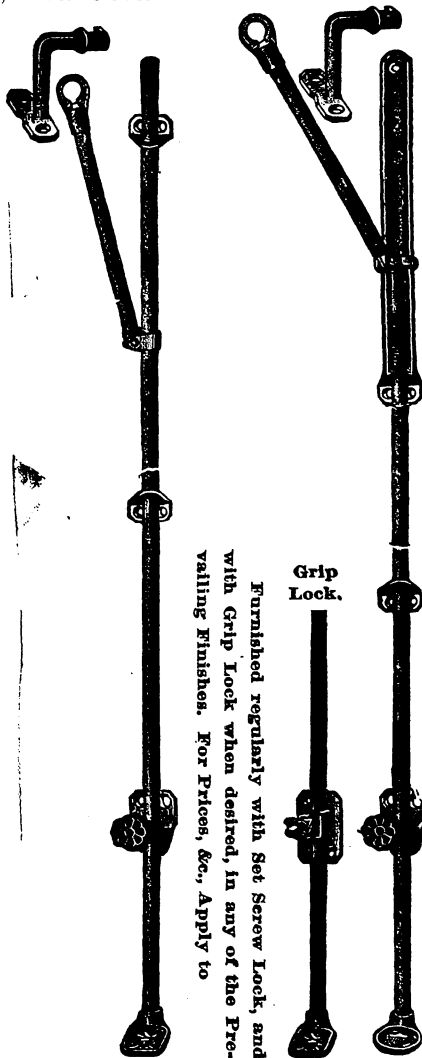
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RAIL, per foot.....		8 1/2 cents

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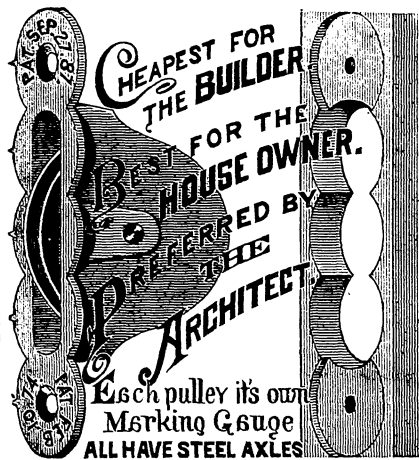


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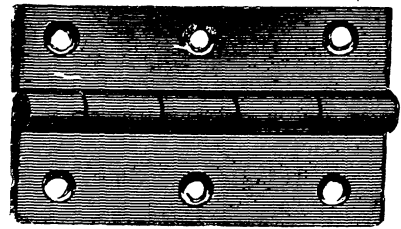
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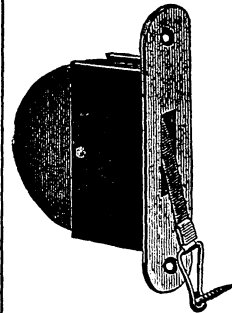
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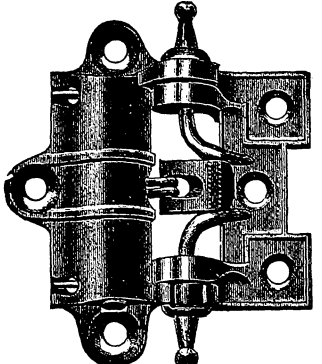
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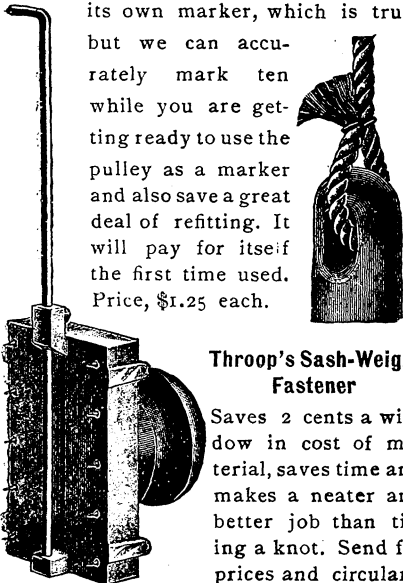
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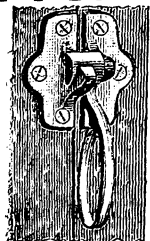
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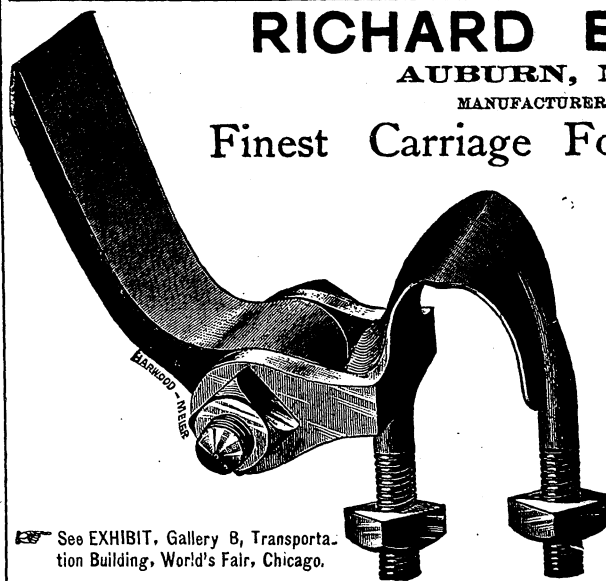
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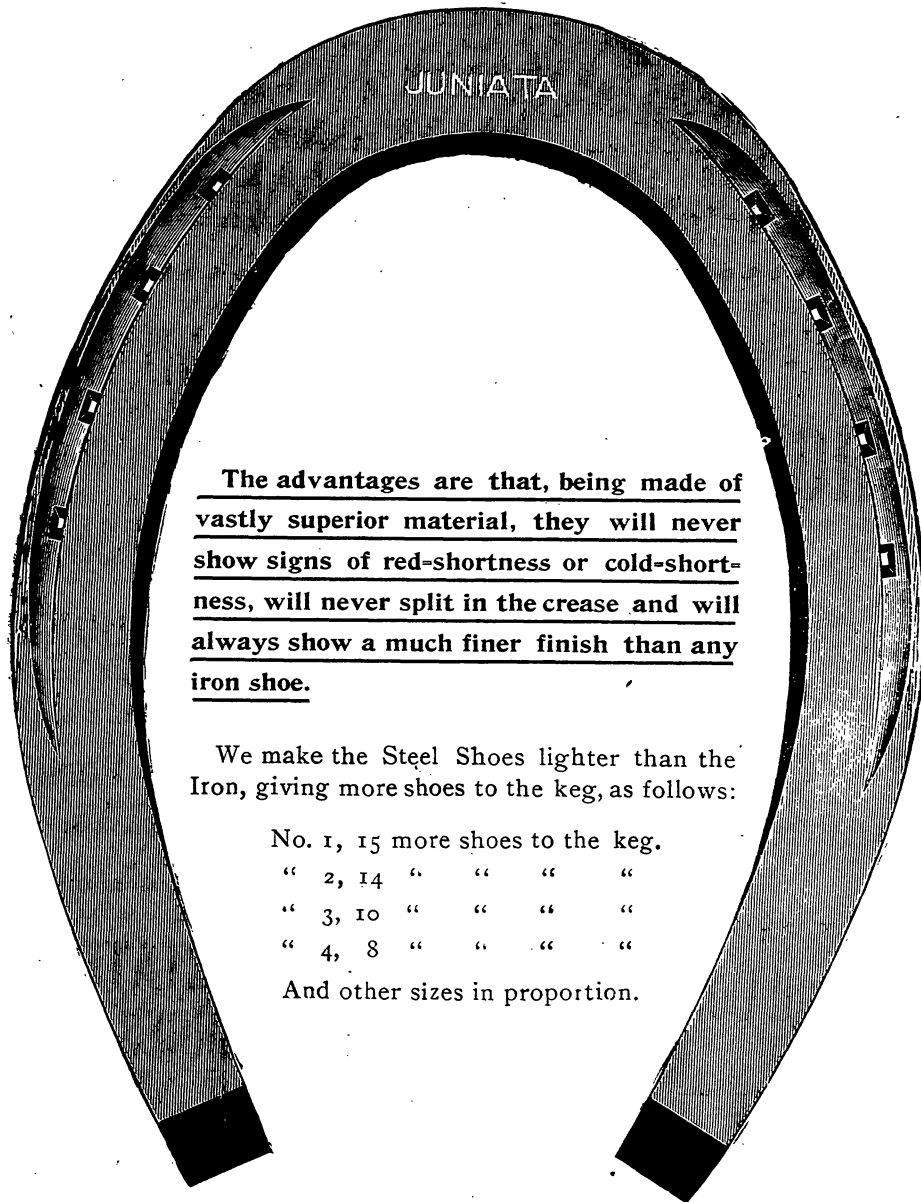
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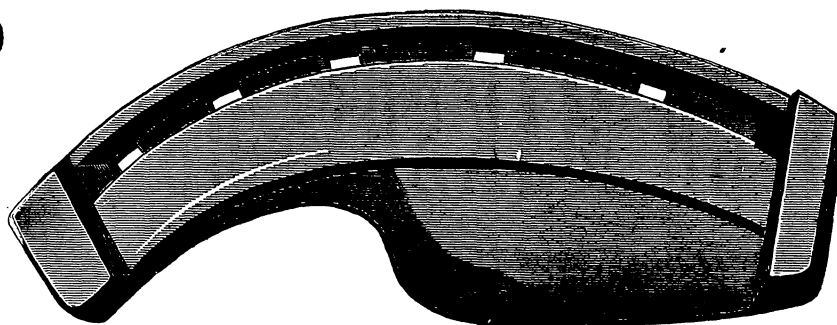
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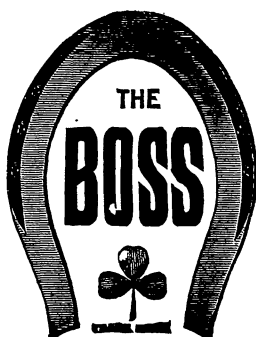
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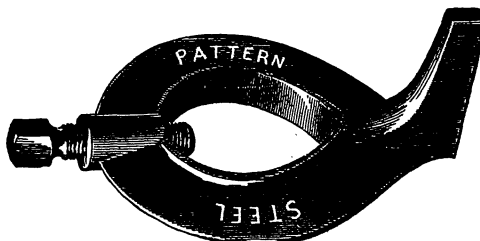
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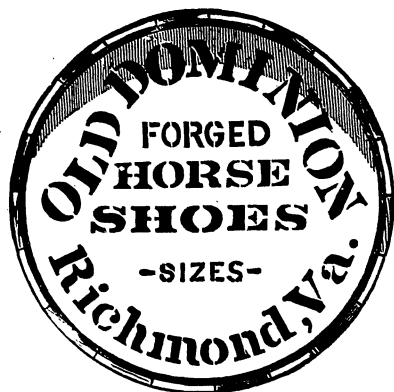
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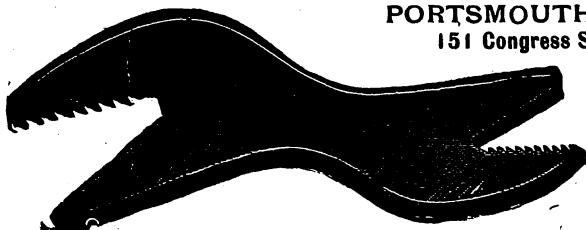
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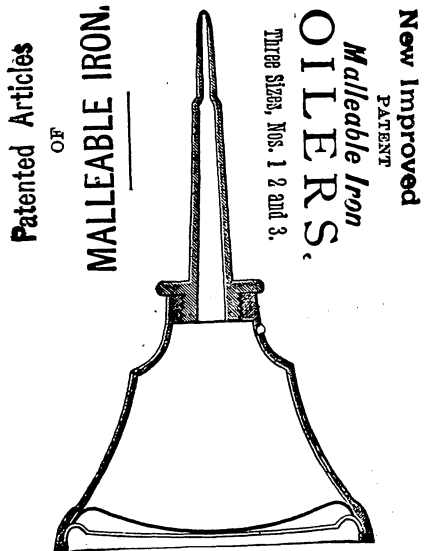


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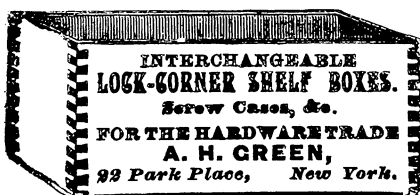
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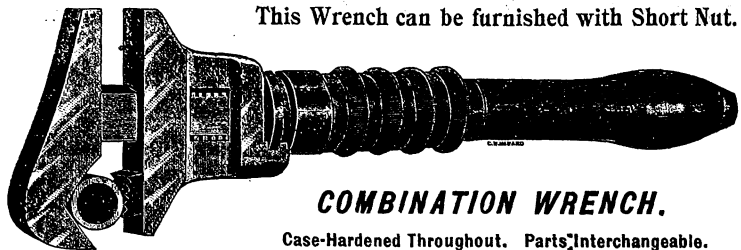
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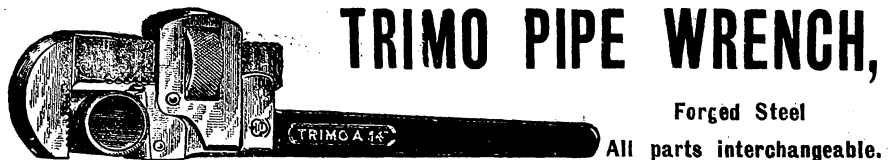
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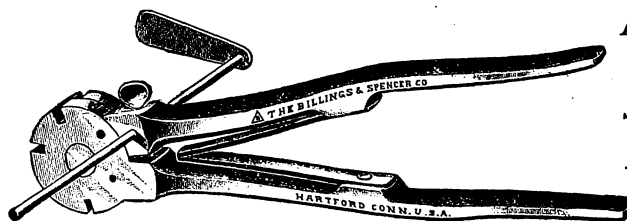
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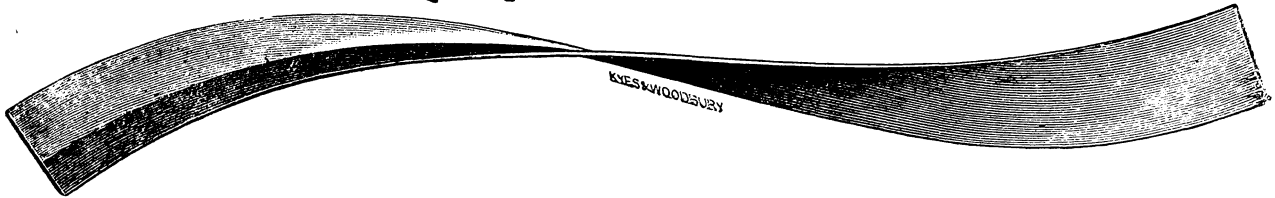
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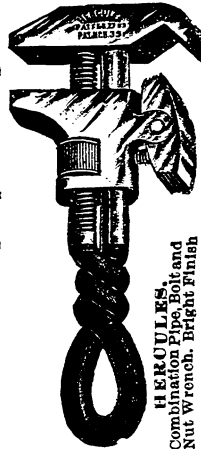
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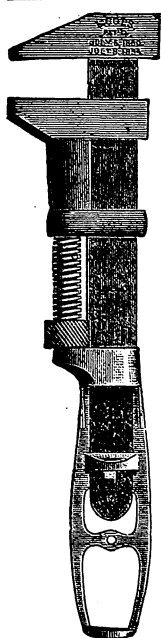
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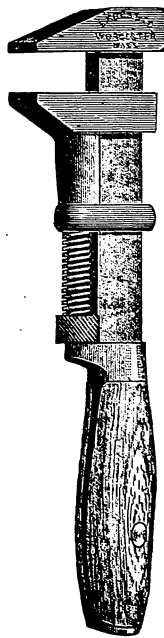
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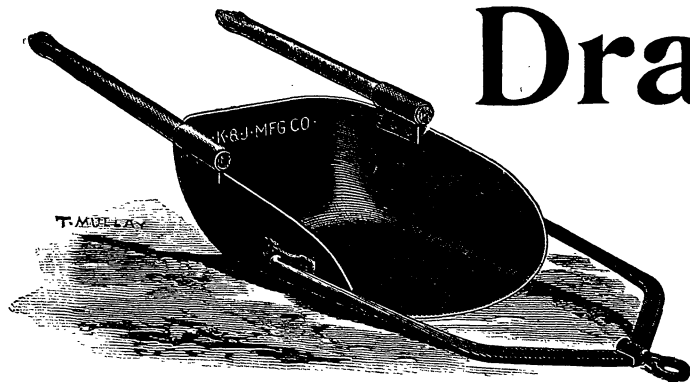
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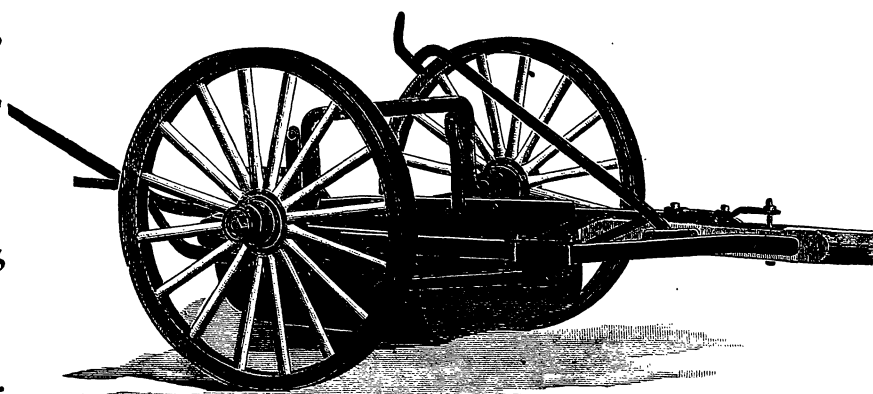
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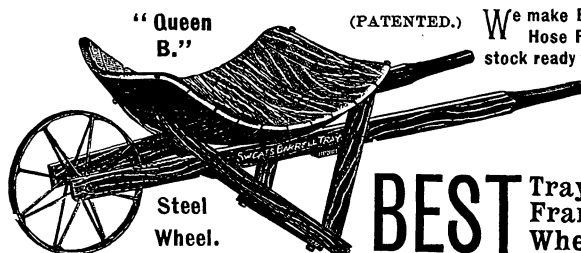
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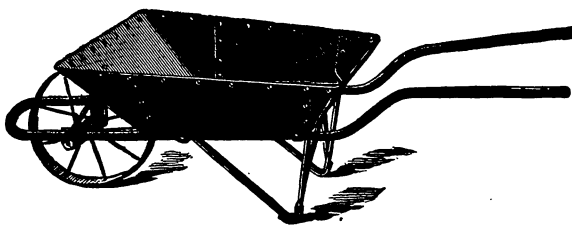
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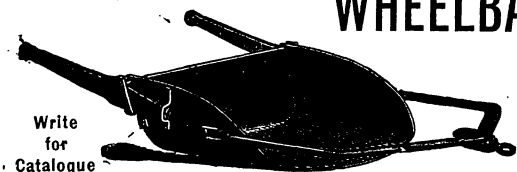
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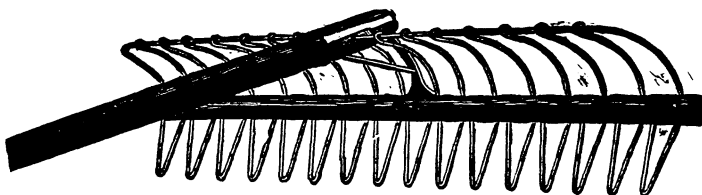
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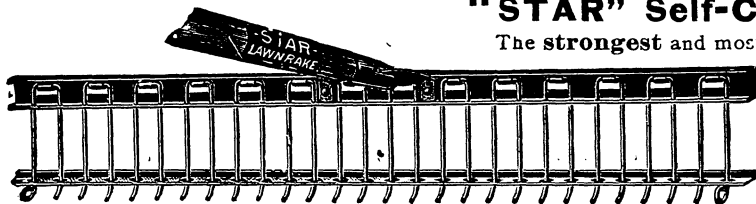
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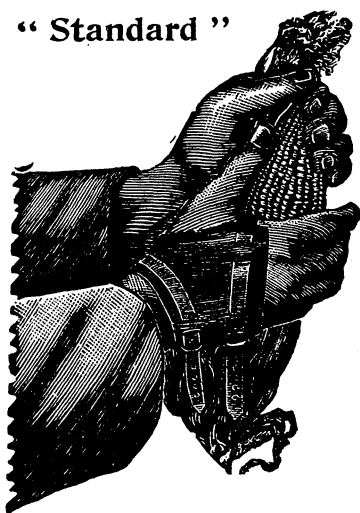


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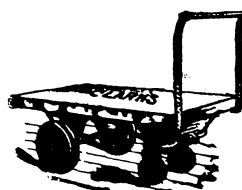
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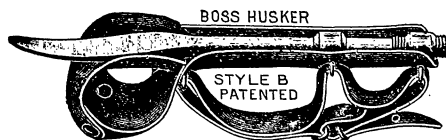
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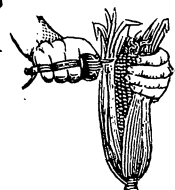
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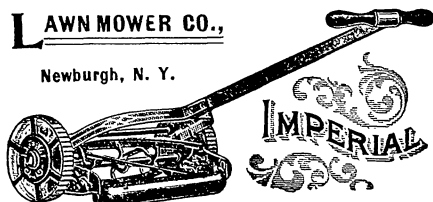
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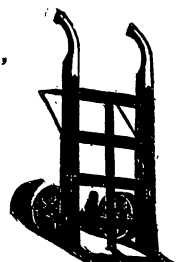
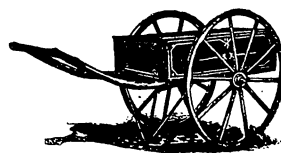
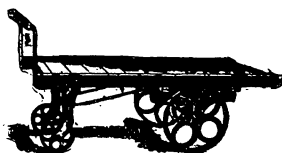
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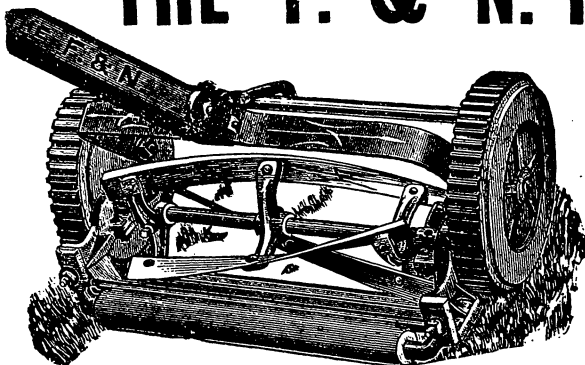
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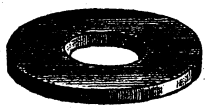
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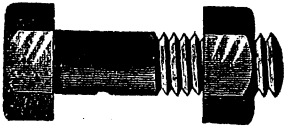
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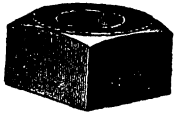
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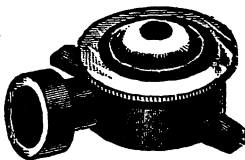


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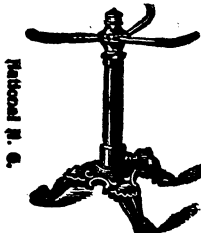


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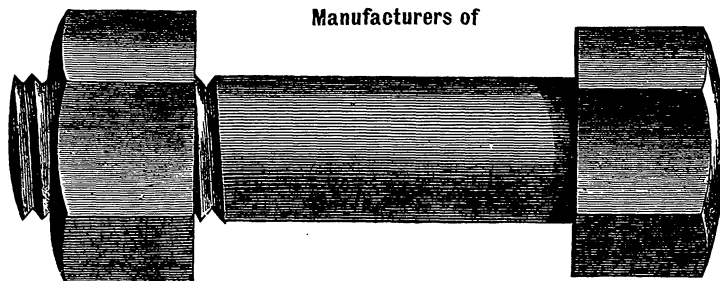
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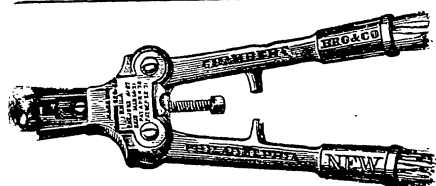
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 Smith, J. D. Fdy. Supply Co., Cin., O.

Friction Clutches.

Keystone Clutch & Mch. Wks., Phila., Pa.
 Moore & White Co., Philadelphia, Pa.

Fruit Pickers.

Cleveland Novelty Co., Cleveland, O.

Fruit Presses.

Enterprise Mfg. Co., Philadelphia, Pa.

Gas Producers.

Wood, R. D. & Co., Philadelphia, Pa.

Gas & Steam Fitters' Supplies.

Pancoast, Henry B. & Co., Phila., Pa.

Gauge, Rolling Mill.

Haines Gauge Co., Philadelphia, Pa.

Gear Cutters.

D. E. Whiton Mach. Co., New London, Conn.

Gears.

Boston Gear Works, Boston, Mass.
 Gleason Tool Co., Rochester, N. Y.
 New Process Raw Hide Co., Syracuse, N. Y.
 Poole, Robt. & Son Co., Baltimore, Md.

Glass Tubes.

Ascheroff Mfg. Co., 111 Liberty St., N. Y.

Glass Cutters.

Monce, S. G., Bristol, Conn.

Glue.

Baeder, Adamson & Co., Phila., Pa.
 Russia Cement Co., Gloucester, Mass.

Grass Catchers.

Supplee Hardware Co., Phila., Pa.

Grinding and Polishing Machines.

Norton Emery Wheel Co., Worcester, Mass.
 Washburn Shops, Worcester, Mass.

Grindstone Dressing Machinery.

Blake & Johnson, Waterbury, Conn.

Grindstones.

Cleveland Stone Co., Cleveland, O.

Gunpowder. Makers of.

Lafin & Rand Powder Co., 29 Murray St., N. Y.

Hand Carts.

Lansing Wheelbarrow Co., Lansing, Mich.

Halter Chains.

Kelley & Woolworth, Niagara Falls, N. Y.

Handles.

New Process Raw Hide Co., Syracuse, N. Y.
 New York Mallet and Handle Wks., 456 E. Houston St., N. Y.

Hangers, Door.

Lane Bros., Poughkeepsie, N. Y.
 Victor Mfg. Co., Newburyport, Mass.

Hardware Comm'n Merchants.

Doscher, Martin, 88 Chambers, N. Y.
 Dief, Alfred & Co., 93 Chambers St., N. Y.
 Graham, John H. & Co., 111 Chambers St., New York.
 Jacobus, W. H., 90 Chambers, N. Y.

Hardware Manufacturers.

Hotchkiss, E. S., Bridgeport, Conn.
 Stearns, E. C. & Co., Syracuse, N. Y.
 Union Mfg. Co., 103 Chambers, N. Y.
 Yale & Towne Mfg. Co., Stamford, Conn.

Hardware Mfrs. Agents.

Bingham, W. Co., Cleveland, O.
 Graham, John H. & Co., 113 Chambers, N. Y.
 Hussey, J. & Co., 80 John St., N. Y.
 McCoy, Jos. F. Co., 28 Warren St., N. Y.
 Sickles, Sweet & Lyon, 35 Barclay, N. Y.
 Underhill, Clinch & Co., 24 Chambers St., N. Y.

Hardware Specialties.

Aome Shear Co., Bridgeport, Conn.
 Belden Machine Co., New Haven, Conn.
 Empire Portable Forge Co., Lansingburg, N. Y.
 Enterprise Mfg. Co., Philadelphia, Pa.
 Ette & Henger Mfg. Co., St. Louis, Mo.
 Haines & Zimmerman, Phila., Pa.
 Hart, H. C. Mfg. Co., Detroit, Mich.
 Henn, A. S. & Co., New Haven, Conn.
 Johnson, S. C., Racine, Wis.
 Knapp & Cowles Mfg. Co., Bridgeport, Conn.
 New Britain Hdw. Mfg. Co., New Britain, Conn.
 North Bros. Mfg. Co., Philadelphia, Pa.
 Peabody & Parks, Troy, N. Y.
 Shepard, Sidney & Co., Buffalo, N. Y.
 Weiland, Chas., 143 Chambers St., N. Y.
 Wilson, J. Fred, Worcester, Mass.
 Wire Goods Co., Worcester, Mass.
 Underhill, Clinch & Co., 24 Chambers Street, N. Y.

Hardware, Yacht and Ship.

Ferdinand, L. W. & Co., Boston, Mass.

Harness Snaps.

Covert Mfg. Co., West Troy, N. Y.
 Coverts' Saddlery Wks., Farmer, N. Y.
 Fitch, W. & E. T., New Haven, Conn.

Hay Knives.

Holt, Hiram, Co., E. Wilton, Me.

Holisting Machines.

Box, Alfred & Co., 314 Green, Phila.
 Brown Holisting & Conveying Mch. Co., Cleveland, Ohio.
 Copeland & Bacon, 85 Liberty St., N. Y.
 Fulton Iron & Engine Wks., Detroit, Mich.
 Hartington, E., Son & Co., Phila.
 Lane Bros., Poughkeepsie, N. Y.
 Lidgerwood Mfg. Co., 96 Liberty, N. Y.
 Maris & Beekley, Philadelphia.
 Moore Mfg. & Fdy. Co., Milwaukee, Wis.
 Morse, Williams & Co., Phila.
 Sellers, Wm. & Co., Phila. and N. Y.
 Spield, J. G., Reading, Pa.
 Yale & Towne Mfg. Co., Stamford, Ct.

Hollow-Ware.

Bronson Supply Co., Cleveland, Ohio.
 Cleveland Stamping & Tool Co., Cleveland, O.
 Stuart & Peterson Co., Phila., Pa.

Holloware, Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill

Horse and Barbers' Clippers.

Hotchkiss, E. S., Bridgeport, Conn.

Horse Nails. Makers of.

National Horse Nail Co., Vergennes, Vt.

Horse Shoes. Makers of.

Bryden Horse Shoe Co., Catsasauqua, Pa.
 Burden Iron Co., Troy, N. Y.
 Crescent Horse Shoe & Iron Co., Max Meadows, Va.
 Diamond State Iron Co., Wilmington, Del.
 Old Dominion Iron & Nail Works Co., Richmond, Va.
 Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
 Rhode Island Perkins Horse Shoe Co., Providence.
 Shoemaker & Co., Pittsburgh, Pa.
 Standard Horse Shoe Co., Boston, Mass.

Hose.

Cleveland Rubber Co., Cleveland, O.
 N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.

Hotels.

The Audubon, Chicago, Ill.

Hydrants, &c.

McLean, John, 296 & 298 Monroe, N. Y.

Hydraulic Jacks.

Dudgeon, Richard, 24 Columbia, N. Y.
 Watson & Stillman, 204 E. 43d, N. Y.

Ice-Cream Freezers.

North Bros. Mfg. Co., Phila., Pa.
 Packer, C. W., Philadelphia, Pa.
 White Mountain Freezer Co., Nashua, N. H.

Ice Shavers.

Enterprise Mfg. Co., Philadelphia, Pa.

Ice Tongs.

Stoppard, Robt, Auburn, N. Y.

Injectors.

Jenkins Bros., New York

Insurance. Boiler.

Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Iron and Steel, Swedish.

Lundberg, Gustaf, Boston, Mass.
 Milne, A. & Co., 1 Broadway, N. Y.

Iron Commission Brokers.

Corning, Edw. & Co., 29 B'way, N. Y.
 Cotton, Bradley & Co., Philadelphia.
 Etting, Edw. J., Philadelphia.
 Hogan, John L. & Co., Philadelphia, Pa.
 Hoffman, J. W. & Co., Philadelphia.
 Levis, Henry & Co., Philadelphia.
 Keeley, Jerome & Co., Philadelphia.
 Lea, J. Tatnall & Co., Philadelphia.
 Mohr, J. J., 430 Walnut, Philadelphia.
 Mann, E. R. & Co., Philadelphia.
 Pilling & Crane, Philadelphia, Pa.
 Sibell, Geo. H. & Co., Chicago, Ill.
 Wister, L. & R. Co., Phila., Pa.

Iron Ore.

Naylor & Co., 45 Wall, N. Y.
 Pickands, Brown & Co., Chicago, Ill.
 Pullman, J. Wesley, Phila., Pa.
 Samuel, Frank, Philadelphia, Pa.

Iron, Merchants.

Barnes, C. K. & Co., Philadelphia, Pa.
 Borden & Lovell, 70 West, N. Y.
 Bussanitus & Cumliffe, Philadelphia.
 Corning Edw. & Co., 29 B'way, N. Y.
 Cox, Justice, Jr., Philadelphia.
 Cotton, Bradley & Co., Philadelphia.
 Hoffman, J. W. & Co., Philadelphia.
 Leonard, J., 446 West St., N. Y.
 Navlor & Co., 45 Wall St., N. Y.
 Nicolls, Wheeler & Co., Philadelphia.
 Ogden & Wallace, 85 Elm St., N. Y.
 Pickands, Brown & Co., Chicago, Ill.
 Pierson & Co., 29 Broadway, N. Y.
 Richards, D. W. & Co., 388 Madison St., N. Y.
 Thomson, W. H. & Co., Phila., Pa.
 Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
 Whitney, A. R. & Co., 17 B'way, N. Y.
 Wilson, E. H. & Co., Philadelphia.

Iron, Importers.

Abbott, Jere & Co., N. Y. and Boston.
 Lundberg, Gustaf, Boston, Mass.

Iron, Sheet. Manufacturers of.

Cambridge Iron & Steel Co., Cambridge Ohio
 W. Dewees Wood Co., Lim., McKeesport, Pa.

Ironwork. Ornamental.

Barnum, E. T., Detroit, Mich.
 Champion Iron Co., Kenton, O.
 Ludlow-Saylor Wire Co., St. Louis, Mo.
 Mast, Foss & Co., Springfield, O.
 The Van Dorn Iron Works Co., Cleveland, O.

Keys.

Wollensak, J. F., Chicago, Ill.

Labels.

Duport, J. C., Westfield, Mass.

Ladles.

Detroit Fdy. Equipment Co., Detroit, Mich.

Lamp Stoves.

Glazier Stove Co., Chelsea, Mich.

Lanterns.

Dietz, R. E. Co., 60 Light St., N. Y.
 Ohio Lantern Co., Tiffin, Ohio.
 Steam Gauge & Lantern Co., Syracuse, N. Y.

Lathes.

Draper Machine Tool Co., Worcester, Mass.
 Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
 Seneca Falls Mfg. Co., Seneca Falls N. Y.

Lathing, Wire.

Clinton Wire Cloth Co., Clinton, Mass.
 N. J. Wire Cloth Co., Trenton, N. J.
 Wright & Colton Wire Cloth Co., Worcester, Mass.

Laundry Machines.

Johnson, S. C., Racine, Wis.

Lawn Mowers.

Chadborn & Coldwell Mfg. Co., Newburg, N. Y.
 Coldwell Lawn Mower Co., Newburg, N. Y.
 F. & N. Mfg. Co., Richmond, Ind.
 Henley, M. C., Richmond, Ind.
 Lape, W. E., Syracuse, N. Y.
 Mast, Foss & Co., Springfield, O.
 Stearns, S. C. & Co., Syracuse, N. Y.
 Supplee Hdw. Co., Phila., Pa.

Lawn Rakes.

Schaeffer & Co., Dayton, Ohio.
 Syracuse Specialty Mfg. Co., Syracuse N. Y.

Lawn Sprinklers.

Ette & Henger Mfg. Co., St. Louis, McGowan, John H. Co., Cincinnati, O.

Lawn Sweepers.

Lape, W. E., Syracuse, N. Y.

Lemon Squeezers.

Ripley Mfg. Co., Unionville, Conn.

Letters and Figures, Metallic.

White, A. A. & Co., Providence, R. I.

Letters, Paper.

Tablet & Ticket Co., Chicago, Ill.

Levels.

Davis & Cook

Machinery.

Am. Tool Works, Cleveland, Ohio.
Barnes, W. F. & John, Rockford, Ill.
Bement, Miles & Co., Philadelphia, Pa.
Bigelow, C. E., 45 Day, N. Y.
Bignall & Keeler Mfg. Co., St. Louis.
Birmingham Iron Foundry, Birmingham, Conn.
Bliss, E. W. Co., Brooklyn, N. Y.
Bogert, Jno. L., Flushing, N. Y.
Briggs, Marvin, 12 Broadway, N. Y.
Carlin's Sons, Thos., Allegheny, Pa.
Cinn. Milling Mch. Co., Cincinnati, Ohio.
Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
Coulter & McKenzie Mch. Co., Bridgeport, Conn.
Cruikshank, D. B., Providence, R. I.
Detrick & Harvey Mch. Co., Baltimore, Md.
Ehrhardt, Gustave & Sons, Pittsburgh, Pa.
Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Laight & Canal Sts.
Gould & Eberhardt, Newark, N. J.
Hamilton Mch. Co., Hamilton, O.
Harrington, E. & Son, Co., Phila. P.
Henderer, A. L., Wilmington, Del.
Rendev Machine Co., Torrington, Ct.
Hill, Clarke & Co., Boston, Mass.
Ingersoll Milling Machine Co., Rockford, Ill.
Johnson, Israel H., Jr., & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Kelly, Daniel, Phila., Pa.
Lodge & Shipley Mch. Tool Works, Cincinnati, O.
Lovegrove & Co., Philadelphia, Pa.
McCabe, J. T., 45 Cortlandt, N. Y.
Machinists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., Waterbury, Conn.
Morton Mfg. Co., Muskegon Heights, Mich.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
New York Mach. Depot, N. Y.
Niles Tool Wks., 138 Liberty St., N. Y.
Pedrick & Ayer, Philadelphia, Pa.
Pittsburgh Mfg. Co., Pittsburgh, Pa.
Place, Geo., 120 Broadway, N. Y.
Foote, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Prentiss Tool & Supply Co., N. Y.
Scranton Supply & Mchry. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia, Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., La., Phila.
Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wilson, W. A., Rochester, N. Y.
Woodruff Mfg. Co., Hartford, Conn.

Machinery for Hardware Manufacture.

Adt, Jno. & Son, New Haven, Conn.

Machine Knives.

Loring Coes & Co., Worcester, Mass.

Machine Tools.—See Machinery.**Machine Work.**

Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.

Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.

King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Inc., Phila.

Mallets.

N. Y. Mallet & Handle Works, N. Y.

Mangles.

Johnson, S. C., Racine, Wis.

Manufacturing Sites.

Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

Measuring Tapes.

Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.

Meat Cutters.

Enterprise Mfg. Co., Philadelphia, Pa.

Metals.

Fearing, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
Naylor & Co., 45 Wall, N. Y.

Metal Brokers.

American Metal Co., N. Y.

Metallogists.

Britton J. Blodgett, Phila.

Metal Saws.

Ehrhardt, Gustave & Sons, Pittsburgh, Pa.
Q & C Co., Chicago, Ill.

Milling Machines.

Cin. Milling Mch. Co., Cincinnati, Ohio.
Ingersoll Milling Machine Co., Rockford, Ill.
Pedrick & Ayer, Phila. Pa.

Mining Knives.

Palmer Bdw. Mfg. Co., Troy, N. Y.

Mine Lamps.

Darby, Edw. & Sons, Phila. Pa.
Leonard, B. E., Scranton, Pa.
Leonard, T. F., Scranton, Pa.

Mining Screens.

Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.
Howard & Morse, 45 Fulton, N. Y.

Motors.

Rice, C. F., Chicago, Ill.

Molding Sand.

Chicago Foundry Supply Co., Chicago, Ill.
Obermayer, S. Co., Cincinnati, O.
Paxson, J. W. & Co., Phila.

Motors, Water and Electric.
C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.
Dallett, Thos. H. & Co., Phila., Pa.

Mail Machinery.

Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
Cleveland Nail & Iron Co., Phila.
Oxford Iron Co., 81 Washington, N.
Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Wks., Wheeling, W. Va.

Nickel Platers' Supplies.

Zucker & Levett Chemical Company, 10 to 14 Grand St., N. Y.

Norway Shapes, Rollers of.

Rowland, William & Harvey, Frankford, Philadelphia

Nut Machines.

Dunham Nut Mch. Co., Unionville Ct

Nuts, Bolts, &c., Makers of.

American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Baker, Wm. H. Co., Pawtucket, R. I.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.
Fort Chester Bolt and Nut Co., Chester, N. Y.
Russell, Burdall & Ward, Port Chester, N. Y.
Sternbergh, J. H. & Son, Reading, Pa.
Wilson, J. Fred, Worcester, Mass.
Wm. H. Haskell Co., Pawtucket, R. I.

Oil Stones.

Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.

Glazier Stove Co., Chelsea, Mich.

Ores.

Wister, Francis, Philadelphia, Pa.

Or Shoes.

Scranton Forging Co., Scranton, Pa.

Packing.

Billington, Jas. H. & Co., Phila., Pa.
Morrison, Robt., St. Louis, Mo.
N. Y. Belting & Packing Co. Ltd., N. Y.
Ames Sword Co., Chicopee, Mass.
Fram, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.
Miller Lock Co., Philadelphia, Pa.

Paints.

Dixon, Jos. Crucible Co., Jersey City, N. J.

Paint Burners.

Dangler Stove & Mfg. Co., Cleveland, O.

Patent Solicitors.

Fitzgerald, S. C., Washington, D. C.
Howson & Howson, Phila. & Washgton.
Jenner, H. W. T., Washington, D. C.
stocking, E. B., Washington, D. C.
Perforated Metal.
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.

Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.

Phosphor Tin.

Crescent Phosphorized Metal Co., Philadelphia, Pa.

Crosby Steam Gauge & Valve Co., Boston, Mass.

Halk & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.

Plumb, Fayette R., Philadelphia, Pa.

Pig Iron.

Houston, C. B. & Co., Philadelphia, Pa.
Mann, Edwin R., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.
Pilling & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.

Pig Iron Storage.

Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

Pile Drivers.

Vulcan Iron Wks., Chicago, Ill.

Pipe, Bent.

National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.

Signal & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Fancost Henry B. & Co., Philadelphia.
Saunders Sons, D., Yonkers, N. Y.

Pipe Grips.

Prentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.

McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas, Makers of.

Umberland Nail & Iron Co., Phila. Pa.
Donaldson Iron Co., Emaus, Pa.
Riverside Iron Works, Wheeling, W. Va.
Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.

Buck Bros., Millbury, Mass.

Planes, Manufacturers of.

Stanley Rule & Level Co., N. Y.

Plate, Iron and Steel, Mfrs of.

Stna-Standard Iron & Steel Co., Bridgeport, O.
Vakens Iron & Steel Co., Coatesville, Pa.
Columbus Valley Iron Co., Youngstown, Ohio.
moorhead-McLean Co., Pittsburgh, Pa.
McIlvain & Sons, Reading, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottsville Iron & Steel Co., Pottsville, Pa.

Plates, Mfrs of.

Singer, Nimick & Co., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Wellman Iron & Steel Co., Thurlow, Pa.
Wood Alan Co., Philadelphia.

Plating, Nickel, Brass and Silver.

Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

Plumbago.

Chicago Fdy. Supply Co., Chicago, Ill

Pokers and Lifters.

Troy Nickel Works, Troy, N. Y.

Polishing Machines.

Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.

La Massena, C. E. & Co., Newark, N. J.

Post Hole Diggers.

Kohler, F. E. & Co., Canton, O.
Wister, L. & R. & Co., Philadelphia, Pa.

Poultry Nettings.

Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
"Silver Fish."
Tyler Wire Wks. Co., W. S., Cleveland, O.

Wright & Colton Wire Cloth Co., Worcester, Mass.

Power Hack Saws.

Millers Falls Co., 93 Reade St., N. Y.

Saw Hammers.

Selden Mach. Co., New Haven, Conn.
Dienet & Eisenhardt, Philadelphia.
Dupont Mfg. Co., St. Johnsbury, Vt.
Jenkins & Lingie, Bellefonte, Pa.
Long & Allstatter Co., Hamilton, Ohio.

Presses, Dies, &c.

E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Niagara Stamping & Tool Co., Buffalo, N. Y.

Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Mch. Co., Waterbury, Conn.

Presses, Power, Makers of.

Bliss, E. W. Co., Brooklyn, N. Y.
Manville, E. J. Mch. Co., Waterbury, Ct.
Serriman, A. H., Meriden.
Niagara Stamping and Tool Co., Buffalo, N. Y.

Stark Mch. & Tool Co., Buffalo, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulleys.

Keystone Clutch, Mch. Wks., Phila., Pa.

Pulverizing Mill.

Bradley Fertilizer Co., Boston, Mass.

Pumping Machinery.

Coulter & McKenzie Mch. Co., Bridgeport, Conn.
New England Steam Pump Works, Indianapolis, Ind.
Hooker-Colville Steam Pump Co., Chicago, Ill.

McGowan, J. H. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.

Southward Fdy. & Mch. Co., Phila., Pa.
"Sley Pump Wks. Easthampton, Mass.
Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.

Bellevue Pump Co., Bellevue, Iowa.
Deming Co., Salem, O.
Douglas, W. & E., Middletown, Conn.
Maat, Foos & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.

Punches and Shears, Hand and Power.

E. W. Bliss Co., Brooklyn, N. Y.
Cockburn Barrow & Mch. Co., Jersey City, N. J.

Crosby, G. A. & Co., Chicago, Ill.
Henderer, A. L., Wilmington, Del.
Long & Allstatter Co., Hamilton, Ohio.
Niagara Stamping and Tool Co., Buffalo, N. Y.

Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.

Wais & Roos, Punch & Shear Co., Cincinnati, Ohio.
Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
Watson & Stillman, 204 E. 43d, N. Y.

Rails, Old and New.

Perry, W. H. & Co., Providence, R. I.
Schwarzenberg Bros. & Co., Cleveland O

Rat and Mouse Traps.

Burditt & Williams, Boston, Mass.
Estey, W. S., 65 Fulton, N. Y.
Ripley Mfg. Co., Unionville, Conn.

Razors.

Bulcher, W. & S., 135 Duane St., N. Y.
Curley, J. & Bro., 6 Warren St., N. Y.
Electric Cutlery Co., 113 Chambers, N. Y.
Schmitz, E., Lothar, 92 Reade St., N. Y.
J. R. Torrey Razor Co., Worcester, Mass.

Reels.

Henrixy, A. B. Co., New Haven, Conn

Refrigerator Door Fasteners.

Conroy, F. J. & Co., Philadelphia.

Rivets.

Blake & Johnson, Waterbury, Conn.
Brook Rivet Co., Muncie, Ind.
Burden Iron Co., Troy, N. Y.
Cobb & Drew, Plymouth, Mass.
Henderson, Jas. S., 165 Greenwich, N. Y.
Plymouth Mills, Plymouth, Mass.
Sternbergh, J. H. & Son, Reading, Pa.
Townsend, W. F. & Co., New Brighton, Pa.

Riveting Machines.

Adt, Jno. & Sons, New Haven, Conn.

Rock Drills.

Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Rand Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery

Birmingham Iron Fdry, Birmingham, Conn.

Booth, The Lloyd, Co., Youngstown, O.
Leachburg Foundry & Mch. Co., Pittsburgh, Pa.

Mahoning Fdry & Mch. Co., Danville, Pa.

Morgan Construction Co., Worcester, Mass.

Robinson-Rea Mfg. Co., Pittsburgh, Pa.

Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Trethewey Mfg. Co., Pittsburgh, Pa.

Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Roll Lathes.

Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel.

Booth, The Lloyd, Co., Youngstown, O.
Garrison, A. Fdry. Co., Pittsburgh, Pa.

Johnson Foundry Co., Johnstown, Pa.

Seaman, Sleeth & Black, Pittsburgh, Pa.

Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.

Berlin Iron Bridge Co., E. Berlin, Conn.
Boston Bridge Works, Boston, Mass.

Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Johns, H. W. Mfg. Co., 37 Malden Lane

Rope and Web Goods.

Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.

Rope Wheels.

Cresson, Geo. V. Co., Philadelphia, Pa.

Rubber Goods.

Candfield, H. O., Bridgeport, Conn.

Rules, Manufacturers of.

Keuffel & Esser Co., 127 Fulton St., N. Y.
Lufkin Rule Co., Saginaw, Mich.

Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers,

Sand Paper.

Baeder, Adamson & Co., Phila., Pa.

Sash Balances.

Caldwell Mfg. Co., Rochester, N. Y.
Fulman Sash Balance Co., Rochester, N. Y.

Stewart & Baker, Rochester, N. Y.
Vanderbilt Sash Balance Co., Canandaigua, N. Y.

Sash Cords and Chains.

Morton, Thos., 65 Elizabeth, N. Y.
Ossawan Mills Co., Norwich, Conn.

Samson Cordage Works, Boston, Mass.
Smith & Egge, Mfg. Co., Bridgeport, Conn.

Cincinnati Corrugating Co., Piqua, O.

Sash Locks.

Ives, H. B. & Co., New Haven, Conn.

Sash Pulleys.

Empire Portable Forge Co., Lansingburg, N. Y.

Palmer Hardware Mfg. Co., Troy, N. Y.

Sash Pulley Marker.

Skelly, J. W. & Son, Bristol, Conn.

Sash Weights.

Brown, E. E. & Co., Philadelphia, Pa.

Sash Weight Fasteners.

Skelly, J. W. & Son, Bristol, Conn.

Saws, Makers of.

- Allentown Rolling Mill.** Allentown, Pa.
Illinois Steel Co., Chicago, Ill.
Lookhart Iron & Steel Co., Pittsburg, Pa.
Passaic Rolling Mill Co., Paterson, N. J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**
Acme Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Etna Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburgh, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pierson & Co., 29 Broadway, N. Y.
Reilly, John W., Fort Hunter P. O., Pa.
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia, Pa.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Shovels, Spades and Scoops.**
Myers, H. M. Co., Beaver Falls, Pa.
- Sinks.**
Douglas, W. & B., Middletown Conn.
- Skates, Ice.**
Dame, Stoddard & Kendall, Boston, Mass.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Henley, M. C., Richmond, Ind.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 780 S. Broad, Phila.
- Speaking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Konigsow, O., Cleveland, O.
- Speed Indicators.**
Church & Slight, 102 Fulton St., N. Y.
- Spelter.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 B'way, N. Y.
- Spring.**
American Spiral Spring Co., Pittsburgh, Pa.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Nourae, Fred Co., 315 to 319 E. 22d St., N. Y.
Roland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Tuck Mfg. Co., Brockton, Mass.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**
Bardsley, J., 149 & 151 Baxter St., N. Y.
Fulman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Spring Keys and Cotter.**
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Sprinklers.**
Smith, Oliver A., Clarkston, Mich.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
Bristols Mfg. Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia, Pa.
Dudgeon, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburgh, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N. J.
- Steam Separators.**
Goubert Mfg. Co., 32 Cortland St. N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
- Steel Balls.**
Grant Anti-Friction Ball Co., Fitchburg, Mass.
- Steel, Cold Rolled Strip.**
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Krogsrud, W., 61 Fulton, N. Y.
- Steel Importers.**
Abbott, Jere & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Wetherell Bros., 93 Liberty St., N. Y.
Whitney, A. R. & Co., B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Etna-Standard Iron & Steel Co., Bridgeport, Conn.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Creighton Steel Co., Pittsburgh, Pa.
Elken & Co., Hagen, Germany.
Frankford Steel Co., Philadelphia.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Illinois Steel Co., Chicago, Ill.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.
Kayser, Ellison & Co., Sheffield, Eng.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Moss, F. W., 83 John, N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Reilly, J. W., Fort Hunter P. O., Pa.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Pittsburgh.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Taylor Iron & Steel Co., High Bridge, N. J.
Widlaw, S. & C., Sheffield, Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**
Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Illinois Steel Co., Chicago, Ill.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Storage.**
Security Warehouse, E. St. Louis, Ill.
- Steve Linings.**
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
Cheney, S. & Son, Manlius, N. Y.
- Stove Trimmings.**
Troy Nickel Works, Troy, N. Y.
- Street Lamps.**
Dietz, R. E., Co., 60 Lighthouse St., N. Y.
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
Electric Cutlery Co., 113 Chambers, N. Y.
J. R. Torrey & Co., Worcester, Mass.
- Stropping Machines.**
Schmitz, E. Lothar, 92 Reade St., N. Y.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Boston Bridge Wks., Boston, Mass.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Nat'l Screw & Tack Co., Cleveland, O.
Phillips, E. & Sons, South Hanover, Plymouth Mills, Plymouth, Mass.
Trufant, W. E., Whitman, Mass.
- Taps and Dies.**
Fatterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawlucket, N. J.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Riehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Riehle Bros. Testing Mch. Co., Phila.
- Theoretical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Frill Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
Berger Bros., Philadelphia, Pa.
- Tinning Process.**
Sands, Thomas, Nashua, N. H.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngstown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St., New York
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**
Burke, P. F., Boston, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Brown, R. H. & Co., New Haven, Conn.
Chantrell Tool Co., Reading, Pa.
Fraser Co., 19 Warren St., New York.
Mayhew, H. H. Co., Shelburne Falls, Mass.
Millers Falls Co., 93 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, New York.
Starrett, L. S., Athol, Mass.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway, Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasolene.**
Dangler Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
- Transom Lifters.**
Wollensak, J. F., Chicago, Ill.
- Trucks, Manufacturers of.**
Berger Bros., Philadelphia, Pa.
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Clark, G. E., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Legg's John S. Son & Co., 4 Fletcher St., New York.
Mannesmann Tube Co. Ltd., Landore, England.
- Tumbling Barrels.**
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Valdard Tool Co., Cleveland, O.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Jenkins Bros., 71 John, N. Y.
McNab & Harlin Mfg. Co., 56 John N. Y.
Mason Regulator Co., Boston, Mass.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Capital Mch. Tool Co., Auburn, N. Y.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Water Meters.**
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Poole, Robt. & Son Co., Baltimore, Md.
- Well Machinery.**
Amer. Well Works, Aurora, Ill.
- Wheelbarrows.**
Akron Tool Co., Akron, O.
Amer. Steel Scraper Co., Sidney, Ohio.
Columbarrow & Mch. Co., Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
- Lansing Wheelbarrow Co.,** Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.
Sweatt Mfg. Co., Minneapolis, Minn.
- Whips.**
American Whip Co., Westfield, Mass.
- Window Cord, Makers of.**
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Amer. Spiral Spring Co., Pittsburgh, Pa.
Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Prentiss, Geo. W. & Co., Holyoke, Mass.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wetherell Bros., 93 Liberty St., F. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Estey, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Reliance Wire & Iron Wks., Milwaukee, Wis.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleveland, Ohio.
- Wire Cutters.**
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Door Mats.**
Hartman Mfg. Co., Elwood City, Pa.
Horrocks, Joshua, 45 Cliff St., N. Y.
The Wire Goods Co., Worcester, Mass.
- Wire Fences.—See fencing, iron and wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Osawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
Wire Goods Co., Worcester, Mass.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T., Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Conn.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, E. & Sons, South Hanover, Mass.
Phillips, Townsend & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Salem Wire Nail Co., Salem, O.
Taunton Wire Nail Co., Taunton, Mass.
Whitney, A. R. & Co., New York, N. Y.
- Wire Rods, Steel.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Illinois Steel Co., Chicago, Ill.
New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel Makers.**
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hazard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamport Wire Rope Co., Williamsport, Pa.
- Wood-Working Machinery.**
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Capitol Mfg. Co., Chicago, Ill.
Central Iron & Steel Co., Brazil, Ind.
Coes Wrench Co., Worcester, Mass.
Keystone Mfg. Co., Buffalo, N. Y.
Portsmouth Wrench Co., Boston, Mass.
Trumont Mfg. Co., Roxbury, Mass.
Williams, J. H., Brooklyn, N. Y.
- Wringers.**
Colby Wringer Co., Montpelier, Vt.

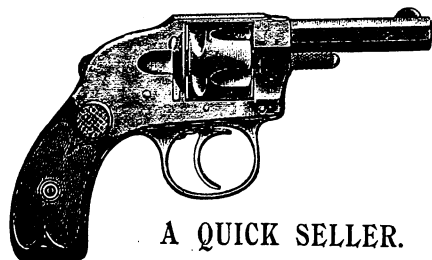
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Bissell, E. Son & Co.....	58	Cobb & Drew.....	7	Frost Thill Spring Co.....	86	Johnson, I. G. & Co.....	104
Blake & Johnson.....	13	Cockburn Barrow & Machine Co.....	93	Fulton Iron & Engine Works.....	50	Johnson, I. H., Jr., & Co.....	50
Bliss Co., E. W.....	40	Coes, Loring & Co.....	91	Gardner, Jas. & Son.....	26	Jones, B. M. & Co.....	22
Boardman, L. & Son.....	65	Coes Wrench Co.....	91	Garrison, A., Foundry Co.....	25	Jones, Jesse & Co.....	65
Bogert, John L.....	59	Coffin & Leighton.....	43	Garvin Machine Co.....	54&56	Jones & Lamson Machine Co.....	62
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Borden & Lovell.....	9	Colliau, Victor.....	31	Glazier Stove Co.....	63	Kennedy, Julian.....	30
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Boss Mfg. Co.....	94	Consolidated Steel & Wire Co.....	15	Goodell Co.....	74	Keyless Lock Co.....	84
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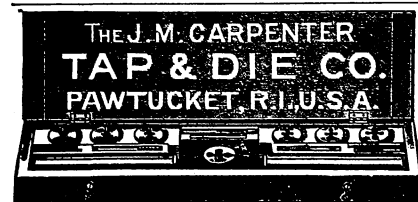
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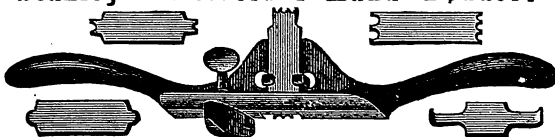
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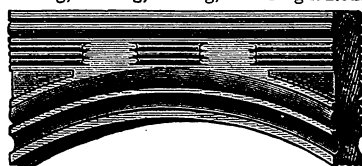
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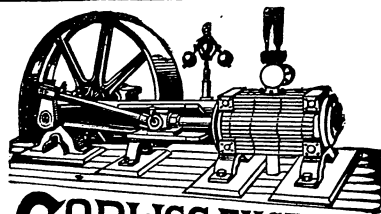
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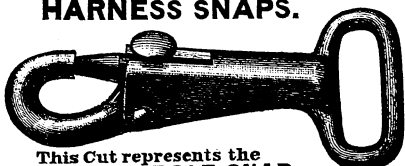
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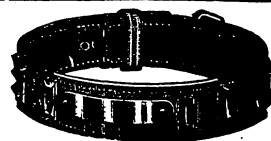
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THE IRON AGE

THURSDAY, AUGUST 24, 1893.

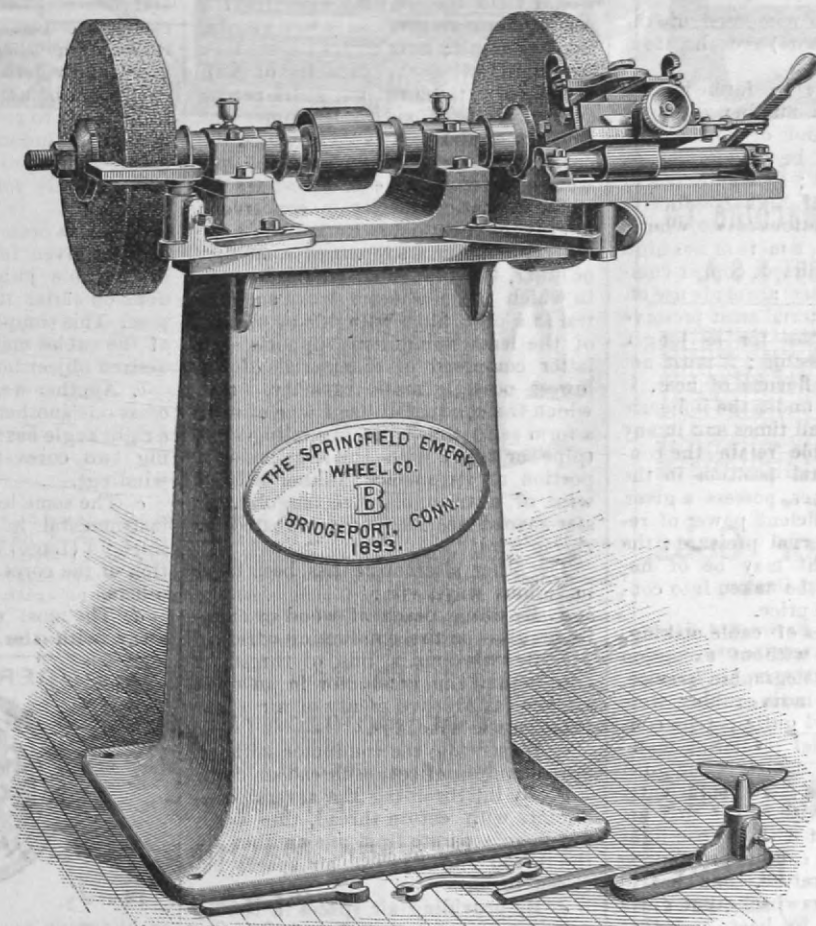
Dynamo Brush Grinder.

The accompanying illustration shows a dynamo brush grinding machine built by the Springfield Emery Wheel Company of Bridgeport, Conn. The machine is provided with a universal slide rest, the clamp of which can be adjusted quickly to grind dynamo brushes of any size. The work is moved forward to the emery wheel by a screw with a milled head in the back of the rest. The work is passed over the face of the wheel by means of the hand

much more accurately and in one-quarter of the time that it takes to fix the brush in the old way.

The English chain makers have forwarded a complaint to the Admiralty that a quantity of old Government chain cable has been bought by unscrupulous dealers and brought into the chain-making district, where it is japanned and sold again as new material. The Admiralty have notified their willingness to inquire into the alleged malpractice; but as all worn out Govern-

Trade." H. Bauerman (one of the jury for mines and metallurgy at the Chicago Exhibition) will discourse on "The Metallurgical Exhibits at the World's Fair;" and Mr. Kupelwieser, the eminent Austrian engineer, will communicate a paper on "The Recent Developments of the Steel Industry in Austria." The other subjects to be dealt with are "The Consett Iron Works," by W. Jenkins, the general manager; "The Weardale Coal & Iron Company," by H. W. Hollis, the manager; "Coal Washing," by James I'Anson; "Wire Manufacture," by J. P. Bedson; "The



DYNAMO BRUSH GRINDER.

lever shown at the right of the rest. The rest can be adjusted easily to give the brush any angle or bevel that may be required. The universal slide rest can be taken off easily and the machine used for general grinding purposes if desired. The general dimensions are: Weight of machine, 500 pounds; height from floor to center of spindle, 37 inches; floor space, 20 x 24 inches; length of bearings, 5½ inches; diameter of spindle in bearings, 1½ inches; diameter of spindle between flanges, 1 inch; distance between wheels, 21 inches; entire length of spindle, 32 inches. Any size of wheel can be used up to 16 inches diameter. The makers claim that with this machine the work can be done

ment chain is stamped with a mark as condemned, the department have done all they can to obviate such fraudulent practices. It is unlikely that the Government will cease to sell old stores because some unscrupulous dealers make a fraudulent use of them.

It is announced that the twenty-fifth autumn meeting of the Iron and Steel Institute will be held at Darlington on September 26, 27 and 28, when an interesting series of papers will be discussed. Professor Roberts-Austen, Assayer of the Mint, will contribute a paper on "The Influence of the Rating of the Rupee on the World's Iron

Sampling of Iron Ore," by Thomas Clarkson; and "Carbon in Iron," by Professor Ledebur.

Briquettes made of solidified petroleum on the system of Lieutenant Maestracci of the Italian navy have been tried on several tugboats at Marseilles, and were found to give out three times the heat of ordinary coal briquettes, while leaving no residue behind. It is hoped that with a few simple modifications of the furnace the calorific effect will be so far increased that the solidified petroleum will equal four times its weight in coal, and that smoke will be almost entirely suppressed.

Improvements in the Art of Cable Making.*

BY EMIL GUILLEAUME, MULHEIM, GERMANY.

The art of cable making has received an increased impulse during these last ten years, from the wonderfully extended application of electricity for telegraphic and telephonic service, for electric lighting and transmission of power, as well as from the growing necessity of placing the leads underground. Every cable for the conveyance of electricity is composed of the cable core (one or more insulated conductors) and the protecting armor or sheathing, and I will discuss these two principal parts of an electric cable separately.

The Cable Core.

The cable core is composed of the conductor (leading wire) and the insulating covering.

The conductor may be formed of a single wire, or of a number of wires formed into a strand or rope. The wire or wires may be of circular or of any other section; as a rule, it will be made of copper of high conductivity, and only in exceptional cases, where, besides conductivity, a more or less high tensile strength is claimed, copper compounds (alloys) and steel are made use of.

The insulating material must preserve the claimed properties for as long a space of time as possible; it must not soften under the influence of heat, it must not get brittle under the influence of cold; it must at all times and in any position of the cable retain the conductor in its central position in the core; it must, further, possess a given tensile strength, sufficient power of resistance against external pressure; the size and the weight may be of importance, and must be taken into consideration; also the price.

At the early stages of cable making, when cables were without exception wanted only for telegraphic service, gutta percha and india rubber were used exclusively, and gutta percha continues to be the chief insulating material for submarine cables. The good properties of both are sufficiently known; however, with cables that are exposed to heat, and with electric light cables, in which the conductor is apt to increase in temperature, one has to reckon with the drawback that gutta percha is softened by heat, and that then the leading wire will sag out of its central position.

The high price of gutta percha and india rubber compelled cable engineers to look for substitutes which might be had in any desired quantity at a reasonable price, and possessing the qualifications for the various purposes of application—viz., low capacity for telephonic purposes, and sufficient strength to withstand the effects of heat and high tension for electric light purposes.

As all fibrous insulation is more or less hygroscopic, it is necessary to prevent any access of moisture; this is done by incasing such cores in a lead pipe—*i. e.*, forming them into so-called lead cables with impregnated or non-impregnated fiber or paper insulation, as almost every large cable works manufacture them now with more or less success in one or another composition.

With the ever-increasing importance of telephonic communication and with the growing want of being able to speak at greater distances through cables, it became necessary to pay particular attention to the capacity of the cable cores, as it was found that certain difficulties which were met with when trying to speak through a cable at great distance were caused by too high a capacity. The injurious influence of static capacity is already experienced on comparatively short telephone cable lines, inasmuch as the transmitted sounds are much more weakened than in passing through aerial lines; indeed, the result was such that at first it was given up as a hopeless case to use cables for long distances. Cable makers were thus put to the task of inventing telephone cables in which the static capacity was to be reduced to a minimum—*i. e.*, in which the conducting wire is covered with an insulating material which, as regards static capacity, would yield the most favorable results. Atmospheric air gives, as is well known, the best result; next comes paper, then paraffine (twice the capacity of air), cotton, silk, india rubber, gutta percha and glass (from six to ten times the capacity of air). A cable in which the conductors were surrounded by air would, therefore, give the best results as far as static capacity is concerned; but as the conductor cannot be kept central without a support of some sort or other, the best cable would be such in which the conductor was kept central in a pipe filled with air by the aid of the least voluminous supports, the latter composed of a material of the lowest possible static capacity, or in which the conductor itself was of such a form as to touch the insulating shell (pipe or tube) with the least possible portion of its surface; either twisted wire of a triangular, rectangular, or star-shaped section, or corrugated or zigzag wire.

The other alternative has been tried in various ways, viz.:

a. By filing beads of wood or ebonite or glass on the conducting wire.

b. By winding a line of thread or cord around the conductor in an open spiral so as to leave plenty of air space between the windings.

c. By serving the conductor with an open braiding of cotton thread or cord.

d. By interbraiding the several conductors with cotton thread, thus keeping them separate from one another by the thread and forming air spaces between them.

e. By providing air spaces in the insulating material (mostly paper tape) by curling or frilling or perforating or embossing the same.

f. By twisting a strip of non-conducting material about its own axis to

paper insulation and air spaces, has given the best results, the static capacity being reduced to 0.06 microfarad per statute mile at a temperature of 60° F., whereas with other cables of the same proportions the capacity would be 0.48 microfarad with india rubber, 0.16 microfarad with fiber insulation, and 0.08 (lowest) with the ordinary paper insulated cables. Thus one can speak through a cable with paper and air insulation over a correspondingly longer distance with the same clearness of sound. This arrangement at the same time allows of the smallest diameter of the cable, and each core is easy to trace.

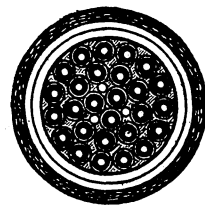
Another important factor in judging of the value of a telephone cable is the absence of induction, the presence of which is the cause of the most annoying cross talk. The best and safest way of overcoming this difficulty will be the introduction of metallic circuits—*i. e.*, to do away with earth connection and provide two cores in the cable for each subscriber. However, this for one reason or another cannot be done in all cases, and where only single conductor cables can be used, provisions will have to be made to reduce the disturbing influence of induced currents to a minimum. This problem has been more or less perfectly solved in different ways, viz.:

a. It has been proposed to cross the cores at given intervals in the cable or in the cable joints, similar to what is done on aerial lines for the same purpose. This complicates the manufacture of the cables materially and attains the desired object but imperfectly.

b. Another way of making the cores cross one another at as near as possible a right angle has been proposed by twisting two cores together in very short windings.

c. The same leading thought has been instrumental in the invention of the solenoid (Lugo) cables, in which a portion of the cores are wrapped round the others.

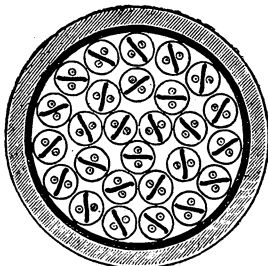
d. The most effectual way of doing away with the annoying influence of



induced currents is a wrapper of tinfoil around each core and the provision of one or more earth copper wires between the cores.

The wrappers of tinfoil collect the induced currents, and, as they are in metallic connection with one another and with the earth wires, the latter need only to be connected to earth in order to remove the induced currents. It must not be overlooked, though, that the wrapper of tinfoil increases the static capacity.

Worth mentioning is the 28-core telephone cable adopted by the German postal authorities. This cable can be used as a single conductor as well as for metallic circuit. To that end the 28 cores are arranged in 7 groups, each of 4 cores. The conducting wires are insulated with impregnated fiber, and each core has a serving of tinfoil. The 4 cores of a group are stranded around a non-insulated copper earth wire. These cables have given excellent results and my firm has recently constructed telephone cables on the same

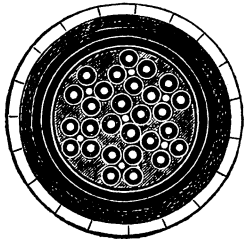


form grooves or air channels in which the conductors lie.

This last named way of solving the problem is an invention of my firm (Feiten & Guilleaume of Mulheim-on-Rhine), whose patent lead cable, with

* Presented at the Mechanical Engineering Section B of the World's Engineering Congress, Chicago, July, 1893.—Abstract.

principle with their patent paper and air insulation, a thin copper strip being inserted in the cross-shaped paper stay to collect the induced currents and lead them off to earth.



The safest way of preventing any annoyance by induced currents is, as said before, the application of metallic circuit—i. e., to provide two lines in the cable for each subscriber. It has hitherto not been possible to more generally adopt metallic circuits on account of the cables becoming more voluminous and more expensive. With Felten & Guillaume's patent paper air-space cable, however, this difficulty is to a great extent removed; their metallic circuit cables are very compact and neither much more voluminous nor much more expensive than the former single conductor cables, at the same time combining the lowest static capacity with an almost total absence of induction.

The splicing of these cables is very simple and can be accomplished by any joiner accustomed to jointing paper cables, the operation being almost the same.

Paper cables with air insulation are with equal advantage applicable to telegraphic service, only that all the dimensions of the conducting wire, cores and cables will be comparatively enlarged. The diminution of static capacity not only prevents, or at any rate lessens, the transfer from one conductor to another, which so often is the cause of disturbances, but it also increases the speed of transmission or, at equal speed, the distance may be extended, thereby rendering the line more remunerative.

The Protecting Armor.

With gutta percha and india rubber cables the armor or sheathing is intended chiefly to protect the cable core against mechanical injury. Submarine telegraph cables are sheathed with round galvanized iron wire. For deep-sea cables it is important that the size of the sheathing wires be reduced as much as possible while retaining a high tensile strength, and improvements in this direction have been made in the way of producing galvanized steel wire of very high breaking strain per square inch of sectional area.

Until the last year or two No. 13 gauge wire, with a breaking strain of about 60 tons per square inch, has been employed for this purpose, but at the present time No. 14 gauge wire, with upward of 85 tons per square inch, is in use, and even No. 15 gauge wire finds employment.

The wires are served with a special compound as a better protection against the injurious effect of sea water. The ravages of the teredo and other insects on gutta-percha cables have been successfully done away with by lapping the core with brass strip.

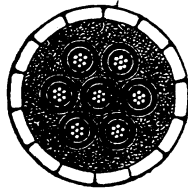
With fiber and paper cables it is of the utmost importance that the sheathing absolutely prevents the access of moisture. Therefore, these latter cables are invariably sheathed with lead, and the improvements which have been proposed in lead sheathing chiefly tend to

having perfectly water-tight sheathing which will retain its water tightness however badly the lead cable is handled.

As a protection against mechanical or chemical injury, a small percentage of tin is sometimes mixed with the lead, usually 3 per cent; also in some cases a second lead sheathing is put on with an intermediate layer of compound between the two sheathings.

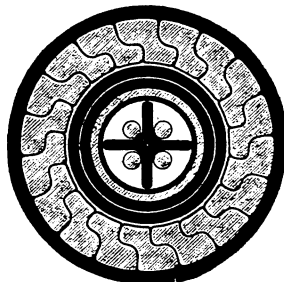
Gutta-percha and india-percha cables are sheathed with lead only when they are used as leading-in wires and at stations.

Where the diameter and a smooth surface of the cable are of consideration, flat wires are used instead of round ones (as supplied by my firm to the German



postal authorities), or the cables are sheathed with iron or steel strips. Underground lead cables for telegraphic and telephonic service are sometimes protected by a sheathing of galvanized iron wires over the lead, and where it is desirable that the cable should have a smooth surface and the smallest possible diameter, my firm employ flat-shaped galvanized sheathing wire.

My firm have also introduced as a novelty the patent locked-wire sheathing in connection with their submarine telephone cables with air spaces. Such sheathing will keep off any strain or



pressure from the core, which is inclosed in a non-compressible tube.

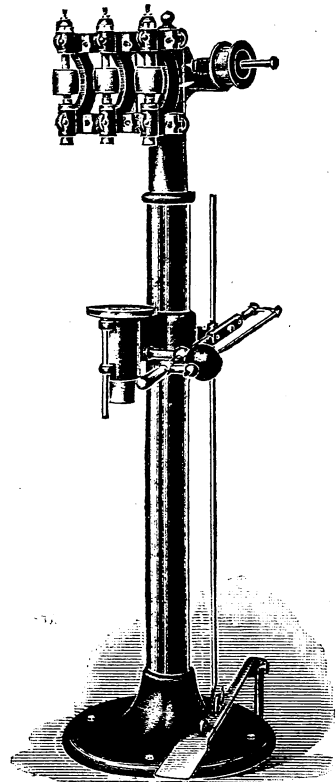
Electric-light lead cables are often sheathed with galvanized wires and, in preference to other kinds of sheathing, with iron strip, which, if imbedded in compound and with an external hemp serving, affords a most effectual protection.

Embarrassment of the Oliver Iron & Steel Company.—The Oliver Iron & Steel Company of Pittsburgh have passed into the hands of a receiver. The application for the appointment of a receiver was made in the courts at Pittsburgh on Thursday, the 17th inst., and Henry W. Oliver, president of the concern, was appointed, bond being required in the sum of \$50,000, with leave to any of the creditors, if they desire, to appear and ask for an increase in the amount of the surety. The bills payable and falling due within 90 days amount to \$400,000. In addition, the company have \$300,000 of collateral bills payable, secured by pledges of pig iron, stocks and bonds, &c., which can be carried on payment of interest. There are also considerable accounts payable,

and a bonded indebtedness, secured by mortgages on the works, of \$585,000, which will not be foreclosed if the interest is paid regularly. It will be remembered that on January 15, 1885, the Oliver Iron & Steel Company, then known as Oliver Brothers & Philips, were granted a five years' extension, the concern meeting their payments as fast as they came due. Before February 1, 1890, the limit of this proposal, the claims had all been paid.

The Lavigne Sensitive Adjustable Drill Press.

Sometime ago the Lavigne & Scott Mfg. Company of New Haven, Conn., found it necessary to make, for their



The Lavigne Sensitive Adjustable Drill Press.

own use in the shop, a press that would drill at the same time two or three holes at any distance from each other to suit the operator. The special feature of this press, which is here illustrated, is that, without changing the single belt, the spindles may be moved laterally so that they will drill at any distance from each other between $2\frac{1}{2}$ and 6 inches. When using but two spindles they may be placed 12 inches apart. By means of two idlers not seen in the cut the drills are all right-handed, and the slack of the belt is taken up by means of a moving bar on which are two more idlers. The machine can be set to drill any given depth, from 0 to 2 inches, and will drill from 0 to $\frac{1}{8}$ -inch holes. From the edge of the column to the center of the spindles is $4\frac{1}{2}$ inches. The counter-shaft is provided with tight and loose pulleys and one three-step cone, which will give three changes of speed without any other cone, on account of the construction of the press. These machines are now made with any number of spindles up to six.

Kansas has still open for settlement nearly 1,000,000 acres of unoccupied Government lands.

The History and Modern Development of the Art of Interchangeable Construction in Mechanism. - I.*

BY W. F. DUFFEE, WEST NEW BRIGHTON, STATEN ISLAND, N. Y.

The term "interchangeable," as applied to mechanism, implies an ability to make a machine and all its component details exactly like a model, and it is obvious in the making of a multitude of examples of a specific machine, if the several details are made exactly like those of the model, that any one of these details can take its appropriate place and perform perfectly its allotted functions in any one of the machines.

The more prevalent modern idea of the interchangeable in mechanism supposes a super-refinement of accuracy of outline and general proportions that is not always necessary, or even desirable. It would be a criminal waste of time and substance to fit a harrow tooth with mathematical accuracy, but yet any harrow tooth should have a practical interchangeable relation to all harrows for which it is designed. The instructive rewards of folly would certainly overtake him who should attempt to make "plow shares" and "colters" with radical exactness; nevertheless, these essential parts of plows should be interchangeable among all plows to which they are adapted.

It is fortunate that there is a recognized practical roughness of interchangeability, and that the refinements of agriculture have not in our day reached the point that that great captain of romance, Lemuel Gulliver, tells us had been attained in the wonderful kingdom of Laputa, which he claimed to have discovered. This allusion to the common practice of our time, of making the parts of agricultural implements and mechanism roughly interchangeable, naturally calls to mind the earliest method of making the metallic parts of implements and apparatus in like manner—the art of casting.

This art has come down to us from a period of which history is ignorant, and from a people whose footprints have been obliterated by the dust and *débris* of uncountable centuries.

We shall never know who made the first crude casting or the circumstances attending its production. In that rude period, doubtless, "the invention all admired, and each how he to be the inventor miss'd; so easy it seemed, once found, which yet unfound, most would have thought impossible."

Few, if any, of the arts have had more potent influence upon the progress of humanity on its long journey from primitive barbarism to what each succeeding age, even to our own day, has complacently described as "modern civilization."

Neglecting the minor examples of the interchangeability of parts produced by the art of casting, we come to the making of movable types.

This art is, without doubt, the most important exemplification of the grand results that have sprung from the original discovery that metals could be given any desired form by melting and pouring them into appropriate molds.

Among the first elements of mechanism to be made interchangeable by

means of machine tools was the toothed gear wheel. An appreciation of the advantages of accuracy in the form of its teeth and uniformity in their spacing was first decisively manifested by makers of clocks and watches.

A general idea of a wheel dividing and cutting machine was suggested by Dr. Hook in the latter part of the seventeenth century, but the first tool of the kind actually used is believed to have been made in France, and to have been similar to one described in Bion's work on mathematical instruments, published in 1702. The French were very much in advance of other nations in the invention of tools and apparatus for the making of clocks and watches. In a work published in Paris in 1741 (*Traité de l'Horlogerie Mécanique et Pratique*, par Thiout, Paris, 1741), there are detailed engravings of three gear-cutting engines, two of which have perforated dial plates, and the third a worm wheel and screw for regulating the spacing of the teeth in the wheel being cut. The method of originating the divisions in the plates of these French machines is not described, but about the same period Henry Hindly (the inventor of the "hour-glass worm"), a clock and watch maker of York, England, constructed a machine for cutting gears which had a perforated dial plate. In a letter to John Sneaton (dated November 14, 1748) he explains the method of dividing the plate of this machine. This method involved the employment of a mechanical device, which in the language of the workshops we would now call a "jig" (see Tomlinson's *Cyclopedia*, Article Graduation), and Hindley is believed to have made the first record of the use of such a tool. In the year 1783 an English mechanic by the name of Rehé made a gear-cutting machine having a dial plate 19 inches in diameter. Some of the cutters used in this machine were made of solid steel, and others had steel teeth inserted in a hub. The teeth of the cutters were shaped to give the proper profile to the teeth of the wheel being cut, and their general form is very suggestive of certain popular cutters used at the present time. As showing the estimation in which good machinery was held in England at the close of the eighteenth century, the fact that this machine was sold after the death of Mr. Rehé for the sum of £700 may be of interest. As a companion to his gear-cutting machine Mr. Rehé made a special machine for grinding and shaping its cutters. The work was done by revolving disks and cylinders of copper, fed with emery and oil. This cutter grinder is believed to have been the first of a race whose various representatives in our day are regarded as indispensable aids to the production of accurate interchangeable work.

In the year 1775 Jesse Ramsden completed in London the most ingenious and perfect piece of mechanism that up to that date had been produced for accurate reduplication—his dividing engine, by which circles within its capacity could be divided into any desired number of equal parts. This machine immediately occasioned important changes in the construction of nautical instruments, and furnished the means for increasing the accuracy of the perforated dial plates of wheel-cutting machines; in fact, the plate of Rehé's machine, already mentioned, was divided upon Ramsden's engine. Although in the best modern dividing engines an automatic feature has been incorporated, they, in the general principles of their construction, are but copies of the invention of Ramsden,

which conferred new powers upon Science, and a greater refinement of skill upon the fingers of Art.

The facility with which the cutters used in the various early gear-cutting machines removed the metal in front of them when in operation naturally suggested the employment of similar cutters for finishing flat surfaces and the irregular outlines of a large variety of shapes in metal; but the progress of the idea was exceedingly slow, and in its development for general purposes mechanics failed to study carefully the behavior of the cutters of that parent of all milling machines—the gear-cutting engine. This lack of careful reasoning from one use to another resulted in the fact that milling cutters, until very recent years, have been run utterly wrong with a degree of precision most wonderful in its results, but which is not especially creditable to the powers of observation and analysis of those responsible for doing so right a thing in so wrong a way. A boy whittling a stick should have been a good object lesson in this connection. The first milling machine for shaping the surface of metal of which we have any account is illustrated in the French *Encyclopedia* whose publication was completed in 1772. This machine was designed for finishing the exterior of musket barrels, and if properly managed it could not fail to make every barrel of precisely the same shape. Milling machines were designed and used by Eli Whitney for use in manufacturing muskets in the early years of the century, and James Nasmyth introduced the use of milling cutters (rotary files they were then called) into England in 1829 for finishing hexagonal nuts, and later extended their use to other work. In America the milling machine in its various forms and adaptations, as manufactured by the Brown & Sharpe Mfg. Company, the Brainerd Milling Machine Company, the Pratt & Whitney Mfg. Company and many other makers of repute, executes a large proportion of the interchangeable work made. In the manufacture of firearms about 40 per cent. of the machine tools used are some form of milling machines. Of one well-known and approved type of milling machine, known as the Lincoln Miller (originally designed by F. A. Pratt), it is believed that at least 150,000, or substantial copies thereof, have been sold within the past 30 years.

Although in America the milling machine is perhaps more generally used than in any other country for small work, yet we have been very slow to recognize its great value for the larger purposes for which it has been successfully employed abroad. Forty-five years ago there was built in England a milling machine for cutting out of the solid metal and finishing at one operation the inside cranks of locomotives. This machine had a cutting disk 51 inches in diameter, armed with inserted cutters moving at a circumferential speed of 28 feet per minute, with a forward feed of $3\frac{1}{4}$ inches per hour. The width of the cut was 4 inches, its thickness 11 inches, and its length, exclusive of the crank pin, 15 inches. After the throat of the crank was cut out, the forward feed was stopped and the shaft then given a rotation about the center of the crank pin, and the whole operation of cutting out the throat and finishing the pin was completed in $9\frac{1}{2}$ hours. Notwithstanding the hints furnished (certainly as early as the year 1702) by the use of circular revolving cutters for the purposes named, the mechanicians

* Abstract from a paper read at the World's Engineering Congress before the American Society of Mechanical Engineers.

of the eighteenth century were many weary years in discovering that the same general ideas so successfully used in metal cutting could be made available in machinery for the working of wood, and it was not until the year 1777, 75 years after the first edition of Mr. Bion's work was published in France, and 54 after it had been translated into English*, that the first patent for the construction of circular saws for wood working was issued. This patent was granted to Samuel Miller of Southampton, England, on August 5, 1777. Among all the workers in wood at that time there appears to have been no one able to transform the revolving cutter—that had been so long used for cutting metal—into the circular saw for the working of wood, and it was reserved for this Miller, a sail maker, who by no conceivable accident ever used a saw of any kind in his handicraft, to invent what may fairly be regarded as the foundation of all the various rotary devices used in the manufacture of interchangeable articles of wood. In the year 1794 Sir Samuel Bentham, in association with his brother, the famous political economist, Jeremy Bentham, established at Queens Square place, Westminster, the first manufactory of machines for the working of wood. These premises being soon found too small, 19 York street was also occupied. The extent of the buildings justifies the inference that a large business was carried on. We are told by Professor Willis, in an address before the Society of Arts in 1852, that "there were constructed machines for all general operations in wood work, including planing, molding, rabating, grooving, mortising and sowing, both in coarse and fine work, in curved, winding and transverse directions, shaping wood in complicated forms, and that further, as an example, all parts of a highly finished window sash were prepared, also all the parts of an ornamental carriage wheel were made, so that nothing required to be done by hand but to put the component parts together." In 1797 the British Admiralty consented to the introduction of Sir Samuel Bentham's wood-working machinery into the dockyards at Portsmouth and Plymouth. This work was done under the direction of Jeremy Bentham at the factory before named. That the machinery made by Jeremy Bentham was thoroughly effective was amply proved by evidence before a Government commission which awarded him £23,000 for the right to use it in the prisons and dockyards of the kingdom.

In the year 1799 Sir Samuel Bentham recommended the adoption of the plans of Mary Isombard Brunel for the manufacture of ship blocks by machinery. The Admiralty authorized the construction of the machines, which were completed in 1806, and so efficient was their operation that the first year's saving was computed at £24,000, two-thirds of which was awarded to Brunel for the right to use his ingenious inventions.

It has long been a popular belief that most, if not all, of the ideas involved in the construction of machinery for the manufacture of interchangeable constructions of wood originated in America, but in view of the remarkable achievements of the Benthams and Brunel that opinion cannot be success-

fully defended, and we must take off our hats in acknowledgment of their great originality and content ourselves with asserting that we have done mighty work in developing the ideas we have inherited, and that America is the largest employer of wood-working machinery among the nations.

It is a commonly expressed opinion by writers that the slide rest was invented by Sir Samuel Bentham, as it is clearly described in his patent of 1793, and there is no doubt whatever but that Henry Maudsley made a tool of that kind while in the employ of Joseph Beumah in 1794, which was named by his shopmates "Maudsley's go cart." Joseph Clement is also deserving of great credit as an improver of the slide rest in the early part of the present century; but it is certain that the evidence relative to the ideas embodied in the slide rest amply justifies the assignment of its origin to France, not only in virtue of the suggestion contained in Beson's work already referred to, but more particularly in view of the fact that in the great encyclopedia of Diderot there is an elaborate engraving of a slide rest which anticipates anything of the kind claimed to have been made in England by at least 20 years.

The first lathe for cutting metallic screws was devised by some French watch maker* early in the last century for cutting the thread on the fuses of watches. The lathe used is remarkable for a taper attachment, quite similar in its idea and functions to that used in modern tools.

The next step in the direction of the modern screw-cutting lathe was made in 1775 by Jesse Ramsden, who constructed a small lathe for cutting the endless screw, or work of his dividing engine. This lathe had change wheels and a tool holder on a slide moved by a lead screw.

In the year 1816 Richard Roberts of Manchester invented the modern form of screw-cutting lathe, and in 1830 a Mr. Parsson of London invented the swiveling tool post, and in 1831 was awarded the silver medal of the Society of Arts for his ingenuity. Prior to 1828 Joseph Clement invented a surfacing lathe in which the speed was automatically reduced and the feed automatically regulated as the tool traveled from the center to the circumference of the work being faced. This lathe was a "gap lathe;" it had flat surfaces for the top of its bed, conical bearings for its main spindle, whose end spoke was taken by a pivot set screw in an oil-tight box, and was provided with a two-speed cone pulley, and a slow speed equivalent to modern back gear, which could be thrown out at pleasure. It also had a compound slide rest.

The invention of the apron on the front of the tool carriage and the idea of attaching the various feed controlling mechanisms thereto is believed to have originated with Baxter G. Whitney of Winchendon, Mass., the well-known inventor of the gauge lathe, who also devised the first universal swiveling bearing for line shafting.

The form of lathe known as the "turret lathe," which has occupied a very important relation to the manufacture of interchangeable mechanisms during the past 30 years, is believed to be of American origin, although no record of any patent can be found and no one

appears to know who designed the first tool of that kind.

So far as ascertained, it seems to have been first made to meet some special emergency, and to have been copied with more or less variation from shop to shop, until at last the Robins & Lawrence Company of Windsor, Vt., at the request of F. W. Howe, made the first machines that were regularly made for sale. Some of these machines were put at work in the factory of the Savage Firearms Company about 1860, and one of the first lot made was purchased by the Brown & Sharpe Mfg. Company of Providence, R. I.; and soon after they commenced to make this tool for the market, and were followed by the Pratt & Whitney Company of Hartford, Conn. The successors of the Robins & Lawrence Company, the Jones & Lamson Machine Company of Springfield, Vt., and the other eminent firms named, have doubtless built a large majority of the turret lathes thus far sold. This tool has commended itself to all makers of interchangeable mechanism for a large variety of work and for the special service of manufacturing machine screws. It has been made automatic by Sharpe of Hartford, Conn., and as its capabilities are carefully studied its field of usefulness continues to expand.

A modification of the lathe which has had a very important influence upon the production of interchangeable work is known as the Blanchard lathe. This celebrated tool was patented by Thomas Blanchard, July 20, 1820, and his patent was twice renewed by special act of Congress for terms of 14 years, the last renewal being dated January 20, 1848.

If we are to believe all that has been written in commendation of this machine tool we shall certainly conclude that Blanchard's invention was an original conception and that it is American genius and inventive talent that the world must thank for an idea that conferred upon mechanism automatic imitative powers that were wholly unknown before. We have not time to discuss all of the evidence of the erroneous character of this view, but we will note a few of its more conspicuous features. As early as 1772, 16 years before Blanchard was born, we find in the great French Encyclopedia an engraving of machinery for turning irregular forms, in which there is a roller operating against a revolving pattern and controlling the movement of the tool in such a way as to produce on the substance being turned a copy of the outlines of the pattern. In Bourgeon's "L'art de Jeuneurs," published in 1816, we are shown methods of reproducing medallion portraits by automatic machinery, and it is well known that in the latter years of the life of James Watt he successfully duplicated busts with mechanism of his contriving. In the famous block machinery of Brunel, which was put in operation in 1806, a revolving cutter was regulated in its action by a profile plate.

Although the invention of Blanchard was not in its chief elements entirely original, nevertheless the combination was sufficiently novel and useful to entitle it to high rank among the more important improvements that have contributed to the perfecting of the art of interchangeable construction.

(To be continued.)

* "The Construction and Principal Uses of Mathematical Instruments." Translated from the French of M. Bion, chief instrument maker to the French King, &c. By Edmund Stone, London, 1723.

* (Traité de l'Horlogerie Mécanique et Pratique, par Thibout, Paris, 1741. There are several fusée lathes described in this work; these tools were in use several years before the work was published. W. E. D.)

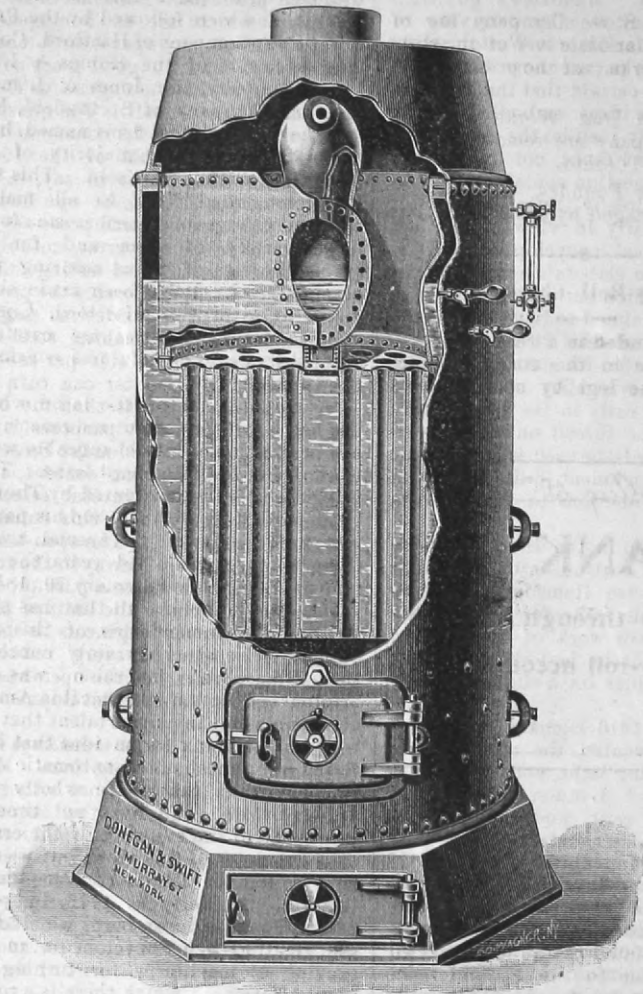
The Falcon Iron & Nail Company, Niles, Ohio, have entered into an arrangement with their employees and the merchants of Warren and Niles

whereby payment of wages will be made partly in cash and partly in interest-bearing notes at 60 days. The arrangement gives general satisfaction, payment of notes being secured by collateral deposited at the banks and subject to approval of the tradesmen's committee. This step was taken for mutual advantage to secure steady work for the men and a system of monetary circulation rendered necessary by the stringency of the times. This company nearly doubled the size of their works recently, having added four sheet mills and a large tin-plate works. Business is improving

alternate cohering and separation of sheets of ordinary tinfoil and paper arranged as a conductor. In the test the speakers' voices were reproduced with remarkable clearness, even a whisper being distinctly heard.

The Donegan & Swift Boiler.

An upright tubular boiler with submerged tubes, and superheating steam chamber is being made by Donegan & Swift of 11 Murray street, New York.

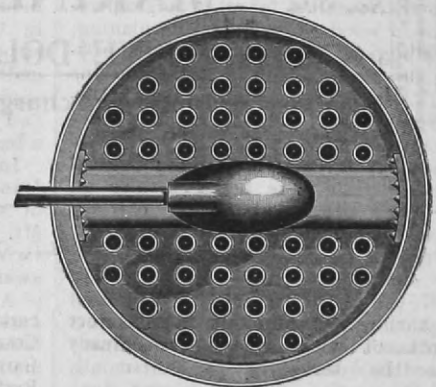


and sides of the dome are open a free passage is obtained for the water and steam. The outlet at the top of the dome is for the steam supply. The dome is surrounded by the flames which pass through the tubes from the furnace, and it therefore serves as a superheating chamber.

The top tube sheet and the tubes are below the water line, thus obviating the danger of the cracking of the head or the loosening and leaking of the tubes. It will be observed that the form of the hood is such that it increases the area and height at the top of the shell, and thus increases the height of the combustion chamber. The boiler is claimed to be a rapid generator of steam, and to be durable and economical in the use of fuel.

Canadian Notes.

The depression which overspreads the United States has not extended into this country to any alarming degree. Our trade returns and the state of our circulation prove that business is more active in Canada than it was last summer or during the fiscal year next preceding the last. Though money has been dearer our manufacturers have never been embarrassed through any want of bank accommodation. The Northwest continues longer than usual to be a debtor to the East for its last year's purchases, and this helps to make



Plan View, Showing Top Tube Sheet.

THE DONEGAN & SWIFT BOILER.

and a steady run is anticipated during the fall months.

A test was made at Saratoga, N. Y., last week, of a new and simplified telephone system, the invention of William Marshall of New York. The test was made between Saratoga and Albany, a distance of nearly 40 miles, over a single ordinary telegraph wire. The result was considered so satisfactory as to indicate a wonderful simplification of telephone service and a great cheapening of cost. It has been demonstrated that a conversation can be carried on by means of this system over an ordinary telegraph wire for a distance of 500 miles, which is as far as an ordinary telegraph message can be sent without repeating. The system is the invention of Mr. Marshall. It is entirely novel in construction and principle. No magnet coil or diaphragm is used, it being dependent only for its acoustic interpretation of electric pulsations upon the

Unlike the plain upright boiler, which has tubes running the full length from bottom to top and in which the tube sheet is parallel with the top edge of the outside shell, this boiler has its tube sheet placed below the top edge of the outer shell. This construction forms a combustion chamber from the top of the tube sheet to the top edge. The inside shell, as shown in the cut, is vertical and parallel with the outer shell to the top edge, and the area of the combustion chamber is the same as that of the furnace. By removing four adjustable plates in the top of the hood of the boiler, the tops of all the tubes can be reached for cleaning or repairing. The inner shell of the chamber is riveted to the top tube sheet and its upper edge is riveted through a ring to the outside shell. The steam dome or chamber is in the form of a cross; the bottom is open and flanged and riveted to an opening in the top tube sheet, the sides being riveted to the inner sheet, as shown in both cuts. As the bottom

money tight, but does not impair confidence, as our implement and harvest machinery manufacturers have produced largely and are forwarding freely stock to be used in the taking off of the present harvest in that part of the country. Our very conservative banks have no hesitation in assisting production, looking to the Northwest for a market. The manufacture of harvest machinery has not been confined to the limits of a domestic demand, for the Massey-Harris Company have made large shipments of their binders to Australia and to Buenos Ayres, and the Canadian Pacific Railroad has done a considerable amount of business in the handling of this class of machinery, having the other day transported 25 carloads to the Pacific Coast, whence it will be forwarded to Australia for the Deering Company of Chicago by the new steamship line now running between Vancouver and Melbourne. Manufacturers of boilers and engines are now quiet, but they have had a good half year.

The stringency in the money markets of the United States has benefited our consumers of such raw material as tin, copper, &c., as the prices of these metals have been very low here.

Interest in the ore deposits of Eastern Ontario is increasing among outsiders. Both Belleville and Kingston are looking on with interest at the explorations and tests that have been and are being made this summer, for the former city has an interest in knowing whether the construction of a furnace is warranted, and the latter to know if a big shipping business may not be built up in its harbor. Mr. Alger, a mining engineer of Hudson, N. Y., has gone over the ground in North Hastings. He is understood to be acting for capitalists who are looking out for a good point to put up smelting works. G. B. Capel, an Englishman of long mining experience, has been surveying the same ground and examining the ore to be found there. He speaks highly of the deposits and has made several offers for different properties. G. A. Longnecker and John Morris of Pennsylvania have also shown an interest in the ores of this region. To make a thorough test of them they bought a cargo at the Wilson Mine near Calahogic. If the furnace test is satisfactory and transportation rates are not too

Lewis Bros. have bought the wholesale stock of Wm. Darling & Co., hardware merchants, Montreal.

Muckleston & Co., wholesale hardware merchants, Kingston, have closed their Peterborough branch.

Pender & Co., St. John, N. B., are enlarging their nail-making establishment.

The Brown Mfg. Company, Belleville, have done a good business in steel bridges this year. Among recent orders is one on the Canadian Pacific Railroad over the cattle market at Toronto, and several at other points on the same road.

The Moffat Stove Company are removing from Markdale to Weston, where their new works are now being constructed.

The Polson Iron Works & Shipbuilding Company are removing their machinery to Toronto.

McDougall's Foundry, at Montreal, was badly damaged by fire a short time ago.

Pay-Roll Checks.

We have alluded in a recent issue of *The Iron Age* to the correspondence concerning the legality of the use of

The Open-Hearth Process.*

BY H. H. CAMPBELL,

Manager of the Open-Hearth Department of the Pennsylvania Steel Company, Steelton, Pa.

1. The Economic Position of the Open-Hearth Furnace.

The comparative merits of the open-hearth furnace and its great rival in the United States, the acid-lined Bessemer converter, must be tested by the uniformity and homogeneity of the respective products. Bessemer heats can be made which are as homogeneous throughout as any open-hearth charge ever melted, and in good practice the proportion of non-homogeneous Bessemer heats is very small. The question, however, is not as to the homogeneity of 99 heats, but as to that of the 100th. In this respect—that is to say, in uniformity, or the likeness of one heat to another, the open hearth possesses advantages over the converter, notably in permitting a system of testing during the operation and in allowing the process to be interrupted at the desired stage of decarburization. In making steel containing from 0.06 to 0.10 per cent. of phosphorus the converter can turn out a product at less cost than the open hearth, and for many purposes it answers well enough. To make Bessemer steel of lower phosphorus content, however, requires a very careful selection of the raw material, and this enhances the cost considerably. The open-hearth furnace affords more leeway in the selection of stock, even where a pure product is desired, and since the limit of phosphorus allowed by engineers is being continually reduced every reduction means more work for the open hearth, and it means also the development of the basic furnace.

Open-hearth furnaces sometimes have been run entirely on pig iron. Much labor is thus avoided, but otherwise there is little gain, for the output is diminished. When solid pig iron is charged the conditions are favorable for the oxidation of the metalloids during melting. In a liquid charge none of this preliminary oxidation has occurred, and the time required for its completion in the furnace cancels part of the expected gain.

Theoretically, nothing is more attractive than a plant comprising a blast furnace to produce the pig iron, a converter to desilicize and partially decarburize it and an open hearth to finish it into steel. Unfortunately, this plan presents difficulties: Sulphurous iron from the blast furnace (if there is only one) necessitates a stoppage of the entire steel plant. If the converter is small, several heats and more than an hour's time are required to prepare one 15 ton open-hearth charge; if large, or if two or more converters are employed, the cost of the plant is considerably increased and the results are not economical unless the converters can be run continuously. Waste is augmented by the duplex system. Ordinarily the reduction of iron from the ore used in the open hearth offsets a part of the loss due to the burning of carbon and silicon, but when these elements are oxidized in a converter, the duration of the heat in the open-hearth furnace will be

* Abstract of a paper read at the World's Engineering Congress, Chicago, before the American Institute of Mining Engineers. The paper itself is the most comprehensive and able presentation of the subject yet published.—Editor *The*

THE MARINE BANK. CAPITAL, \$200,000. SURPLUS, \$600,000. PAY-ROLL CHECK.	\$5.	BUFFALO. <i>Aug 15</i> 1893.
	No. 392 MARINE BANK	
	Pay to Bearer FIVE DOLLARS through the Buffalo Clearing House and charge to pay-roll account of	
	Certified by The Marine Bank of Buffalo.	

A PAY-ROLL CHECK.

high they will probably purchase ore lands, of which they have already leased 4000 acres.

A skilled mining engineer is to be sent from London, England, to examine the nickel-bearing deposits of St. Croix, Quebec, with a view of reporting upon their worth as an investment.

Thomas Edison, the great electrician, was in Toronto the other day. He had been inspecting some mining lands near Sudbury.

A big order for pipe to conduct natural gas from South Gasfield to Walkerville has been placed by Hiram Walker & Sons with a Pittsburgh firm.

The Dominion Safety Lamp & Brass Works Company have lately started in Montreal.

The building, machinery and patterns of the Hayden & Dunbar Foundry and Machine Shop, at Woodstock, N. B., were destroyed by fire. No insurance.

The steel pipes for conveying water to the power house at the "Soo" Canal are to be tendered for by the pound. They will cost between \$30,000 and \$40,000. Plans are now out. The large steel tube is to be 6 feet 8 inches in diameter, constructed as to flanging and riveting so as to give a strong, watertight tube over 1000 feet in length.

A new wire-nail factory has been started in Carleton, N. B.

certified checks as currency between the Comptroller of the Currency and F. B. Baird of the Buffalo Furnace Company, Buffalo, in which the official named expressed the opinion that there is no legal objection to it. As a matter of interest to a good many during the present scarcity of currency we have reproduced by photography a pay-roll check issued by the Marine Bank of Buffalo for F. B. Baird. We are advised by Mr. Baird that he would advise the omission of the words "pay-roll check" since they are not necessary. The check is certified by the assistant cashier of the bank, as indicated. The check itself is 7½ x 3½ inches.

We may state that in some localities the use of checks of this character has not worked very well. Local merchants at first took them in payment and gave change. Very soon, however, they accepted them merely by placing the amount to the credit of the holder, declining to give change on them.

Work is being rapidly pushed on the two jetties now being constructed at the entrance to the harbor of Galveston, Texas, for the purpose of increasing the depth of water on the bar. Operations on the north jetty at Point Bolivar, 6 miles from the city, are also progressing. These improvements will materially enhance the capacity of the port of Galveston.

nearly as long, and the work nearly as costly, as though the metal had not been blown at all. On the other hand, if carbon be entirely eliminated, difficulty will be encountered in producing a suitable slag on the hearth. In basic practice the metal must remain in the furnace long enough for the removal of phosphorus; the presence of this impurity in moderate quantity calls for at least 1 per cent. of carbon in the bath, so as to afford sufficient time for the production and action of a good slag. In combination, however, with basic open-hearth furnaces and a large plant, the desilicization of a phosphoric iron in an acid converter may be very advantageous, for in such a case the duplex process would do away with the demand for low-silicon pig iron, and thus improve the chances for the elimination of sulphur in the blast furnace.

2. The Regenerative Furnace and Machinery.

The proper size of the furnace is a question of convenience. It is an error to suppose that a large furnace does not make as good steel as a small one. The objection to an abnormally large furnace is entirely in the handling of the product. When ingots are to be worked before they cool, a flood of 100 tons of ingots at one time, once in ten hours, is far less desirable in the rolling mill than five lots of 20 tons every two hours. Hence five 20-ton furnaces are preferable to one of 100 tons.

The furnace itself, as designed by the writer, is placed upon rockers, the tap hole being above the slag line. By tilting the hearth with a hydraulic cylinder, any part of the charge may be poured when desired. The end joint is made by the abutting of two flat, water-cooled rings.

The Pernot furnace has not fulfilled the high expectations entertained for it when first introduced. The hastening of the work by rotating its inclined hearth was dearly paid for in a waste of iron and scorification of the bottom, so that, in the United States at least, the hearth is no longer revolved while the charge is melting, except to bring unfused areas beneath the flame. Against this furnace must be urged the difficulties attending the construction of the ports, the care of the ever-open joint and the impossibility, with any existing form, of repairing the hearth in the interval between charges without removing the bottom. For these reasons, though furnaces of this type have been run successfully for years, the author ventures to say that their application to open-hearth work is a thing of the past.

The gas and air should meet in the furnace about 5 feet from the metal; if at less distance, combustion will be checked by contact with the cold stock; if much further away, the brick work will be rapidly melted. Some difficulties are overcome by making the roof extremely high and keeping the flame clear of the metal. Oxidation is thus diminished, and in some cases it has been found, as would appear natural, that the time of the operation has been lengthened by the high roof.

The ordinary four-way butterfly reversing valves are very prone to warp. Water cooling has been tried with some success, but it should be applied to both the box and the valve. The better way, however, is to construct an entirely different type of valve, such as a disk valve, shaped to withstand unequal heating and provided with a water-cooled seat and with means to easily replace the injured parts.

Each year the revolving hydraulic ladle crane has been made safer and stronger; the cylinder should be large enough for twice the load it will ever be called upon to lift. The traveling crane has obvious advantages, yet the metallurgist has heretofore condemned it on account of its greater liability to breakage. The introduction of an electric traveler, with a hydraulic lift, and pump carried on the bridge, offers for the first time a combination of the elements of safety of the hydraulic crane with the advantages of the traveler type.

3. Fuel.

The injurious effect of steam in producer gas is a matter for debate. Moist gases unquestionably occasion greater oxidation of the metal than a dry carbonic-oxide flame, but it is difficult to see why it will be greater when the moist gas is burned than when an equal amount of water is produced by burning hydrogen. If steam is so baneful the use of water gas or any highly hydrogenated fuel must be a mistake, but it is quite possible that the bad reputation of steam is due to the gases with which it usually is associated. Increased oxidation by the flame during melting is often considered advantageous; during the last stages of the operation, however, a perfectly neutral flame is desired, and, though such a flame cannot be obtained for any length of time, the conditions are more nearly approached in burning carbonic oxide than in burning hydrogen. By proper attention the difficulties attending the use of an inferior fuel can be largely overcome, and the question is narrowed to a consideration of relative cost.

It has been claimed that the volatile hydrocarbons in the gas contribute largely to its calorific value, and that the chemical analysis of the gas, as usually made, does not reveal its true heating properties, since these powerful constituents are condensed in the sampling tub and thus do not appear in the analysis. Careful experiments by the writer, on gas that had traveled through 400 feet of exposed iron pipe and had been cooled to 40° C. as it entered a 5-ton furnace which was doing excellent work, showed that one-eighth of the calorific value of that gas was due to suspended hydrocarbons. Although this does not represent all the suspended material in the gas as it left the producer, it does represent all the suspended matter in the gas as the latter entered the valves of a furnace in regular and economical operation. When it is shown that only one-eighth of the calorific power of such a gas is due to suspended hydrocarbons, it seems incredible that complete scrubbing—that is, even the entire removal of the suspended material—would give a worthless fuel.

During a run of eight months and a consumption of 8000 tons of coal, 44,000 pounds of tar were collected from the conducting pipe, representing three-tenths of 1 per cent. of the total calorific value of the fuel.

In the gasification of bituminous coal, the thermal losses found by the writer for a given practice were:

	Per cent. of total heat generated.
Potential heat lost in residue.....	5.9
Latent heat of volatilization.....	7.3
Decomposition and heating of steam..	4.3
Radiation and conduction.....	4.3
Sensible heat of gas.....	13.2
Total.....	35.0

All these items of loss, except the last, would occur in a system of direct

heating. The sensible heat of the gas should be regarded as a total loss, since a rise in temperature at the entrance flue of a reversing furnace means a similar and equal rise in temperature for the products of combustion escaping to the stack. The advocates of placing the producer near the furnace seem to overlook this fact—namely, that whatever is gained by the hot gas at the incoming end is lost on reversal in the outgoing products of combustion. For the two months recently elapsed, two 25-ton acid furnaces, 250 feet away from the producers, show a production of 6250 tons of steel with a consumption of 872 pounds of coal per 2240 pounds of product. This is by no means a minimum; the record of a single month shows a consumption of only 783 pounds of coal per ton of product.

4. Regulation of Temperature.

It is difficult if not impossible to determine the degree of heat attained in melting steel, but for practical purposes it suffices to know the relative temperature, and this can be determined by the eye with wonderful accuracy. As a test of the delicacy of the ocular determinations, we may calculate the refrigerating effect of 45 kg. (approximately 100 pounds) of cold pig iron thrown into a charge in the Bessemer converter and we find that it produces a net absorption of 10,079 calories, which reduces the temperature of the metal bath by 9° C. If steel scrap be used for the addition the absorption will be 13,895 calories, and the reduction in temperature 13° C. These variations in the temperature of the bath are perceptible to the naked eye. An excess or deficit of 500 pounds in the addition of scrap makes the charge either so hot that it causes trouble, or so cold that it skulls badly in the ladle. A variation of 200 pounds from the true amount, which would show a variation of about 30°, is the greatest error allowable in good practice. Incredible as it may seem, within such narrow limits lies the success of the Bessemer blower and the open-hearth melter.

5. The Thermal Equation of the Furnace.

If we neglect the loss of heat in the producer, and take for our basis the potential heat coming to the furnace in the gas, we shall have, as the summary of a detailed calculation showing all the items of heat absorption for one charge:

	Calories.	Per cent.
Loss from sensible heat in waste gases.....	246,710	14.6
Loss from imperfect combustion.....	69,390	4.1
Absorption in melting and heating.....	290,000	17.2
Radiation by difference..	1,078,830	64.1
Total.....	1,684,930	100.0

That only one-ninth of the total energy of the coal, or one-sixth of the potential power of the gas, is used in the actual melting of the stock appears surprising; yet the correctness of the result is confirmed by the fuel consumption required to maintain an empty furnace at a temperature considerably below working heat, that requirement, as I have elsewhere shown, being nearly as great as if the furnace were in active operation.

6. The Acid Process.

In making soft steel most melters aim to proportion the pig iron of the charge so that the melted bath shall be free from silicon and manganese, and

shall contain from $\frac{1}{4}$ to 1 per cent. of carbon. During the subsequent elimination of this carbon the metal is in a state of continual ebullition, and then its temperature and condition, as well as the character of the slag, may be completely controlled in preparation for the recarburization and casting. If insufficient pig iron is used in the charge the bath will contain neither silicon, manganese nor carbon, and will be pasty. Such a mass is rapidly oxidized by the flame, and the oxide of iron scorifies the bottom. If, on the other hand, too much pig iron is used, it is easy to lower the carbon content by the action of the flame, or by the addition of ore; hence it is safer to err by supplying an excess rather than a deficiency of carbon.

Intermittent charging, in which all the pig iron is melted and superheated before preheated scrap is added, is practiced for several reasons: (a) Where preheating of the stock is practiced it is almost necessary to charge in separate lots, as otherwise the capacity of the preheating furnaces would have to equal that of the melting hearth. (b) In hot weather it would be a destructive tax on human endurance to fill a 25-ton furnace at one time with preheated stock. (c) Successive additions of scrap facilitate the arrest of the process at the desired point. (d) Oxidation is supposed to be diminished, but if the oxidation in the preheater is included this is doubtless a wrong supposition. (e) The addition of cold stock chills the bath and retards the melt, hence preheating is advisable whenever it is necessary to make several partial charges. (f) Intermittent charging may be necessary when the regenerative chambers of the furnace are so small that the addition of an entire charge of cold stock robs them of their heat and necessitates a long period of recuperation. This condition can obtain only with radically bad construction. Thus intermittent charging results directly or indirectly from inferior design, and preheating is its unavoidable concomitant. In a good furnace the whole charge can be put in cold at one time without injury to the roof or checkers, or excessive oxidation, and with great economy in fuel and labor.

In ordinary practice the scrap is charged first and the pig iron is spread upon it, the purpose being to protect the scrap as far as practicable from exposure to the flame. When only a small proportion of pig is used, the scrap will be uncovered in places and large quantities of iron oxide will be produced. This cinder may subsequently be reduced by contact with high-carbon metal, but if it comes in contact with the hearth scorification ensues, and though at a later period the scoria may be mixed with high-carbon metal, the harm cannot be completely remedied. Hence, to avoid waste of iron, the pig metal should be so distributed as to receive the direct action of the flame, and particularly to guard the slag line or line of contact between the surface of the metal and the hearth.

Since we rely on the metalloids in the pig to preserve the iron from oxidation the value of any individual lot of pig will depend upon the amount of such foreign elements—namely, of silicon, manganese, carbon and rarely titanium.

By detailed calculation, the writer shows the amount of pig iron of a given composition required in a charge of 60,000 pounds, in order that the bath may contain 1 per cent. of carbon when melted, though he adds that in practice every competent metallurgist can esti-

mate closely the required amount of any given pig iron, without resorting to calculations based on chemical valences.

The record of an open hearth charge is essentially one of oxidation. As a general rule, the most easily oxidizable elements are burned first. An exception, however, is to be noted which in practice calls for the intervention of a slag blanket between the metal and the flame. After the silicon and manganese have been oxidized, one would suppose, *a priori*, that their products could be removed, the carbon burned, and the metal be superheated; but in practice, without a slag covering on the metal, the iron would be largely oxidized by the flame and the metal would cool even under the best of flames. After complete fusion, and the formation of an adequate quantity of slag of proper composition, there is no further strong tendency toward an increase in the amount of slag. During melting the flame burns the oxidizable elements of the bath by transmitting the oxygen through the slag. The work may be hastened by successive doses of ore, or by blowing air into the bath. Blowing air has been tried with some success; but the scorification of the hearth, the cutting of the roof and walls and the loss of iron through the ports have prevented the extended adoption of this practice.

Exact calculations upon the open-hearth bath are almost impossible, but it is practicable to approximate very closely to accuracy by taking a series of similar consecutive heats and weighing and analyzing all the materials, and determining the scorification of the bottom by the amount of sand required to repair it. With sufficient data, obtained in this way, the weight of the slag may be calculated as follows for any period of the melt:

The final slag, after tapping, is weighed cold. By subtracting from this weight the MnO produced by the addition of the recarburizer, and the sand derived from the tap hole and ladle linings, the amount of slag which was in the furnace before tapping may be computed. Given the analysis of the slag at that time, it is easy to calculate the weight of its various constituents, among which will be the manganese; if the ore contained no appreciable quantity of this element, the amount which in one form or another was present throughout the operation will be known; and since the percentage of manganese in the slag and in the metal can be determined by analysis, and the weight of the metal can be calculated for any stage of the work, all the requisite data are at hand for a determination of the weight of the slag at any given time. With this determination as a basis, the quantitative estimation of the factors is a matter of simple arithmetic. In this way the writer has investigated 19 consecutive heats melted with soft coal producer gas, and six consecutive heats made with Archer oil vapor.

The results show that the stronger oxidizing action of the hydrogenated fuel containing steam, as compared with producer gas, necessitated the use of more pig iron, yet less ore was required, for although the carbon was higher when the bath was melted, the greater power of the oil flame was felt as well after fusion as during melting. The burning of the greater quantity of silicon in the pig, however, and the increased scorification of the hearth, due to the more oxidizing oil vapor flame, produced a larger amount of silica, and

this took a correspondingly larger amount of bases from the bath.

The percentage of ore reduced was nearly the same in both groups of heats, a result, however, which is purely accidental. To investigate more closely the action of the ore addition, the heats may be classified according to the additions of ore, and then it appears very clearly that the percentage of iron oxide reduced rises with the amount of ore added. The action may be better understood by examining the results at different stages of the operation. For this purpose four heats are selected, in each of which 1500 pounds of ore were used. It is shown by elaborate tables that during the addition of the first 500 pounds of ore the amount of iron oxide reduced was the same as during the addition of the second 500 pounds, but in the third period there was a slight decrease in the amount reduced and an increase in the amount imparted to the slag, without, however, increasing the basicity of the slag.

With regard to the metal, the two groups of heats show that 74 to 78 per cent. of the total oxidation was done during melting, but these percentages are purely empirical and special, depending primarily on the total content of oxidizable material. It may be assumed that the amount of oxidation during melting is constant, so that the percentage will depend upon the excess of oxidizing agents in the charge.

The tendency is toward the almost complete elimination of silicon and manganese during melting, the carbon being protected by their greater affinity for oxygen, or in some cases by the less favorable physical condition of the slag. If the temperature of the metal is very high, the last traces of silicon are not oxidized, a parallel and more marked case being the well-known fact that with the Bessemer process, steel can be made containing 1 per cent. of silicon, if blown sufficiently hot, since the relative affinity of oxygen for silicon and carbon is a function of the temperature.

(To be continued.)

Mesaba News.

The Biwabik Mine, located in section 3, town 58-16, is the best developed of any of the Mesaba mines, and probably a good deal more money has been spent on it to the present time than on any other. It has also shipped more ore than any other mine on the range to date, its work for the 23 days during which shipping has been carried on being in round figures 30,000 tons. The mine is now closed, but it will reopen so soon as there is any chance to sell ore or to get advances on the ore as shipped. Like all other Mesaba mines the Biwabik has had a hard financial time of late, and it was decided to close it down for a time.

The Biwabik Mountain Iron Company own the lease of the property, the fee being held by wealthy timber land owners; the iron company have subleased to the Biwabik Ore Company, the control of which is in the hands of P. L. Kimberley and other Sharon, Pa., investors, and John T. Jones, formerly manager of the Hamilton and Ludington mines of Michigan. The fee holders demand a royalty of 25 cents and 30 cents a ton on an output of 1000 tons a year for five years, and 5000 tons a year thereafter. The iron company secured a sub-lease to Kimberley *et al* at 50 cents royalty and a minimum output of 300,000 tons, reserving also 43 acres,

which they sub-leased to John Barringer at 50 cents royalty and 100,000 tons minimum output.

Some months ago John T. Jones and H. V. Winchell made a report on the Biwabik to the meeting of the Institute of Mining Engineers. They then showed that \$60,000 spent in stripping earth off the ore and in sinking pits had showed up about 20,000,000 tons of ore. They then defended the stripping proposition for mining such deposits, but could give no results. Since then the company have spent \$30,000 or more additional capital, have completed the stripping of an area of some 2 acres, and have defined their deposit in depth, so that they know that there are about 25,000,000 tons, of which by far the greater proportion is Bessemer ore.

At present the stripped area averages about 20 feet in depth. A railway track runs down into the mine on a sharp grade and two cars are sent in at a time. They are run into a face of ore 18 feet deep, and a steam shovel beside the track has been able to fill both cars, 24 tons each, in seven minutes. The average limit of loading in a full day, including switching and moving ahead the shovel, is not far from 60 cars. So far only one shovel has been used in mining. Three others and two trains of dummy cars have been stripping, but are now shut down. The ore is the usual soft-blue grade of the Mesaba, but it has been found advisable to put a drill ahead of the shovel and shake up the deposit with black powder.

Drake, Stratton & Co. of Pittsburgh, who have several very heavy stripping contracts at the Mesaba, are now at work at this mine. They expect to strip the earth from the entire east 40-acre tract of the mine—a mammoth job—and one that will require not far from three years for completion. Three large shovels and seven small engines are employed, as well as 125 men.

The mine ships exclusively over the Duluth, Missabe & Northern road, the majority of stock in both concerns being in the same hands. There is, of course, no possibility that the mine will ship anything like its agreed minimum this year, nor is it at all sure that it will ship any more than it has so far.

The new railway and docks are getting started well. A train of 52 cars, or 1300 tons, was brought down last Friday by a single locomotive; while at the docks Saturday three cargoes were loaded. The average time of loading is expected to be about 1½ hours on a 2000-ton cargo after the dock machinery gets into trim. There is, so far as can be learned, no truth in the rumor published in Cleveland that the Minnesota Iron Company have secured interests in leading Mesaba stocks.

The total iron ore shipments from the Lake Superior ports—not including Escanaba—up to August 1, are 1,721,000 tons, a decrease of about 14 per cent. from last year. This entire decrease is from the Gogebic range, shipments from Ashland having fallen off 440,000 tons from last year, when they were 1,133,000 tons. Marquette shows an increase of about 100,000 tons, at the head of the lake, Duluth district, an increase of 60,000 tons, caused by the Mesaba range. But the August reports will show a falling off far greater. Escanaba shipments are a great deal below last year.

The regular monthly meeting of the Western Foundrymen's Association should have been held in Chicago on

the evening of the 16th inst., but the attendance was so small that an adjournment was taken until September 20. An effort will be made to arrange to hold this meeting in the rooms of the Associated Engineering Societies, at the World's Fair. The topics to be discussed are those intended for the meeting of last week.

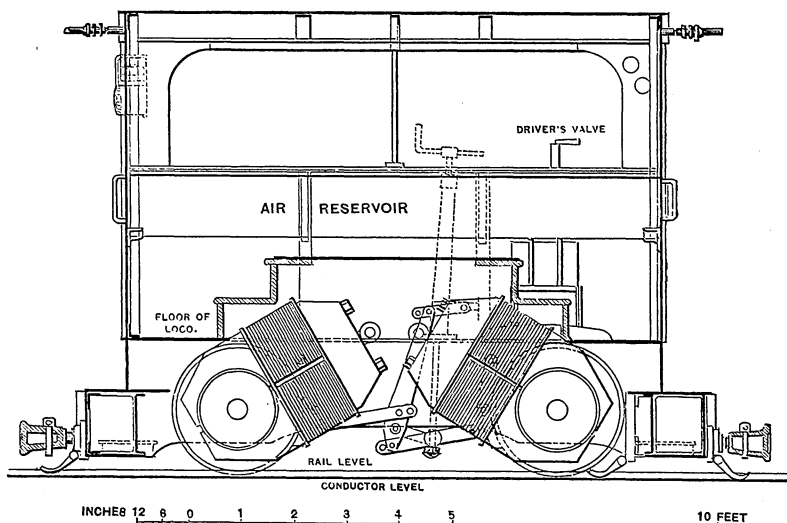
Electric Locomotive Without Gearing

In the Minutes of Proceedings of the Institution of Civil Engineers, we find a paper of Edward Hopkinson on "Electrical Railways: the City and South London Railway," in which is a description of a novel form of electric locomotive, of which we reproduce the sectional view. The author says:

The essential feature in the design of the locomotives is that the armatures of the motors are built directly upon the axles, while the magnets are supported partly on the axle and partly on the frame. Thus gear of any description

electric motors; in fact, the perfect freedom of the axle laterally, and the fact that the two driving axles are not coupled, but have entire freedom of motion relatively, together with the consideration that the forces acting on the axle, apart from its weight, constitute a pure couple without any thrust, make it probable that a much higher limit of dead weight may be safely allowed in a system of electric motors, so applied, than in the case of ordinary steam locomotives. It has, however, been contended that the vibration must have an injurious effect upon the armature. In reply, it is sufficient to point out that the experience of two years' working has not revealed a single case of deterioration of an armature which can be attributed to this cause; and the bearings supporting the field magnets have shown no signs of undue wear.

In order to obtain experience of the relative advantages of geared and direct-acting locomotives under the same conditions, one geared locomotive was built for the South London line. Though of



ELECTRIC LOCOMOTIVE WITHOUT GEARING.

is entirely obviated, and the mechanism is reduced to its simplest elements. Although this principle of direct driving was suggested many years ago by the late Sir William Siemens, it has not previously been applied in practice. The field magnets embrace the armature, leaving but an exceedingly narrow "gap," and are supported in part by brackets parallel to the axle with bearings upon it, and partly by links connecting the yokes to a cross beam of the locomotive frame, thus permitting limited freedom of angular motion of the field round the axle, compensating for the rise and fall of the axle boxes in the horn blocks. The weight of one axle with its wheels, axle boxes and springs, and with the armature attached, is 24 hundredweight, and the part of the weight of the magnets resting on the axle is 10 hundredweight; hence the total dead weight on each axle is 34 hundredweight. In ordinary locomotive practice, where the speeds are much greater and the permanent way more elastic, the dead weight, including wheels, cranked axle, axle boxes, springs, eccentrics, and the large ends of the connecting rods, is much greater, and there appears to be no reason why the limit allowed in the case of ordinary steam motors is not permissible for

the same power as the others, and yielding good results in experimental running, its relative value may be best gauged by the fact that it was soon relegated to the work of a stand-by engine, while the regular work of the line was undertaken entirely by the direct acting type. To sum up, it appears that the balance of argument is in favor of direct-acting motors for both locomotives and street railway work, but that, with regard to the latter, experience is yet insufficient to warrant the formation of a final opinion.

The two motors on each locomotive on the South London line are each capable of developing 50 horse power at a speed of 25 miles per hour, corresponding to 310 revolutions of the axle per minute. The magnets are of the "Edison-Hopkinson" form, and series wound, and the armatures are of the Gramme ring type. The resistance of the magnet coils of each motor is 0.087 ohm, and of the armature 0.3 ohm. The two motors are connected electrically in series. The current from the conductor is conveyed from sliding collectors through a fusible cut out and main switch to a rheostat switch for inserting resistance at starting; thence it passes through a reversing switch to the motors, and finally through the axle boxes and wheels to the rails of the

permanent way. The motor magnets are proportioned relatively to the armature precisely as in a dynamo, and are wound so as to be nearly saturated with the mean working current. Above this point the curve of tractive force and current is approximately a straight line, giving a tractive force of 1180 pounds with 100 amperes and a maximum of 3000 pounds with 226 amperes. The trains are fitted with the Westinghouse continuous automatic brake, applied, however, in a novel manner suggested by Mr. Greathead. In place of a pump working continuously on the locomotive, the latter is provided with two reservoirs placed under the curved side plates of the cab, each of about 8.25 cubic feet capacity. At the end of each double journey these are charged with air at 80 pounds pressure from a small reservoir erected at Stockwell, the pressure in which is maintained by two small pumps in the engine house. The reservoirs on the locomotives are of sufficient capacity to provide for about 30 stops from full speed. This system has proved both convenient in practice and economical, the total amount of steam required for the brakes being about 1.5 per cent. of the entire consumption. In addition to the Westinghouse brake, a powerful hand-screw brake is fitted on each locomotive. The locomotives and carriages are lighted with glow lamps, supplied direct from the conductor, an arrangement which has the merits of simplicity and cheapness, but is open to the objection that the light is necessarily subject to some fluctuation owing to the variations of the electromotive force of the conductor.

The following are the leading dimensions of the locomotives:

	Feet.	Inches.
Length over central buffers..	14	0
Length over cab.....	10	0
Wheel base.....	6	0
Diameter of wheels.....	2	3
Gauge.....	4	8½
Extreme width of cab.....	6	3
Height, rail level to floor plate	2	5¼
Height, floor plate to roof.....	6	0
Weight of entire locomotive, 10 tons	7	
hundredweight.		
Weight of motors only, with wheels and axles, 6 tons.		

THE WEEK.

The managers of the Chesapeake and Ohio Canal are considering the advisability of using electricity as a motive power. Should it be found practicable, the canal will be covered with a series of trolley wires for its entire length of 180 miles.

The following figures show the exports of breadstuffs from the principal Atlantic ports of the country during the fiscal year ending June 30 last:

	Corn.	Wheat.
New York..	12,290,243	39,519,574
Boston.....	3,596,836	3,806,878
Philadelphia.....	4,252,443	9,424,410
Baltimore....	6,524,162	14,218,961
New Orleans.....	4,265,749	14,290,360

Florida's orange industry shows a very gratifying increase. From a production of 600,000 boxes in 1885, the amount marketed the past season was 3,900,000 boxes, while according to conservative estimates the coming crop will be fully 5,000,000 boxes.

Secretary Keep of the Lake Carriers' Association attributes the present depression in lake traffic largely to an overproduction of vessel tonnage. Since 1886 the new tonnage has not fallen below 50,000 tons a year, and has exceeded 100,000. During the past 12 months more than 70,000 tons of freight

carriers have gone into commission. Up to the present year the increased traffic has kept pace with the tonnage, but this year, while there has been no falling off, there has been no growth in the traffic. There are now 11 boats for every 10 cargoes.

A new method of felling trees is reported as having been successfully tried in the Northwest. A chain of compressed cakes of gun cotton is tied around the trunk and exploded, the action cutting the tree down, it is said, as smoothly as though done by an axe.

In July, for the first time in its history, the Sault Canal had more than 2,000,000 tons of freight traffic passing through it in a single month.

The Manhattan Railroad Company, under the presidency of George Gould, have finally decided not to extend their lines owing to the financial stringency. In consequence the New York Rapid Transit Commissioners have cut off all communication with that corporation and decided to promptly adopt an independent route and system of rapid transit roads for the city.

Fire insurance companies strongly object to the hazard of taking power from trolley wires to run elevators, &c. A recent case of this description at Scranton, Pa., has been condemned by experts for its danger.

The Union Steamboat Company, one of the most successful lines of lake carriers, passed into the hands of receivers last week in consequence of their connection with the Erie Railway system. The line was started by Jay Gould and "Jim" Fisk 25 years ago and has been all along among the largest earners on the lakes.

The Canadian Government has granted permission to the United States authorities to proceed with the work of improving the Detroit River channel at Lime Kiln Crossing, in Canadian waters, irrespective of the boundary line, stipulating, however, that such permission is without prejudice to Canada's rights of possession as designated by treaty.

Hon. F. I. Coombs, ex-Minister to Japan, who has just returned from that country, says the Japanese Government is doing all it can to discourage emigration, especially to the United States.

The decision of the arbitrators in the Behring Sea question has been received with satisfaction by both Great Britain and the United States. While being a legal triumph for the former, America has practically gained most of the points at issue.

Italian immigration is suspended, steamship companies refusing to bring over immigrants during the prevalence of cholera at Naples and other Italian ports.

A large amount of real estate exchanged hands in Chicago last week in the course of settlement with creditors by Cudahy, Fairbank and other losers in the late provision collapse.

Denison, Texas, suffered a serious loss a few days ago in the destruction by fire of the Denison Exposition Building, which contained valuable samples of all the mineral resources of the State and of the Indian Territory.

The second International Maritime Congress was carried to a very successful termination in London at the end of July, under the presidency of Lord Brassey. Representatives of 18 European nations were present, and a

large number of valuable papers were read. The subjects embraced were breakwaters and sea defenses; docks and their equipment; the construction and maintenance of ports on sandy coasts; lighthouses, buoys and fog signals; ocean passenger steamers; the transport of oil in tank steamers, and the construction of dredging machinery.

The Philadelphia mint has received orders from Washington to push the small gold and silver coinage as rapidly as possible, working overtime if necessary as the Treasury stock of small coin is becoming depleted.

Some modifications of the Custom House ordinance now prevailing in the island of Cuba will, it is reported, be decreed by the Spanish Government, which will put an end to the frequent difficulties experienced by foreign shippers in entering their goods.

Of the 356 members of the new Congress, 333 are of American birth and 23 were born abroad of foreign parentage.

Lord Jersey, ex-Governor of New South Wales, who has just returned to England, expressed in the most emphatic terms his belief that the restoration of prosperity to trade in that colony is only a matter of a comparatively short time. He declared that he would not hesitate for a moment to invest capital or buy property there. Lord Jersey, in common with most men who can speak with authority on the trade of Australia, believes that the present difficulties are only of a temporary nature, and will soon disappear.

An agreement has been signed by the Pacific Mail Steamship Company and the Panama Railroad Company whereby the former charter to the railroad company their three ships running between New York and Cuba.

The establishment of a Government dockyard is being considered in connection with the proposed improvement of the Mexican navy. The port of Guaymas is said to be its probable location. Vera Cruz is to have an arsenal and a floating dock. The latter is being built in France.

It is generally expected in Calcutta, India, that exchange will settle down to a 16-pence level in the course of a few weeks, when the recent excessive silver importations have been absorbed and when the export trade, which is now at its dullest point, begins to revive.

Sir Charles Tupper, High Commissioner for Canada in London, has invited 12 British tenant farmers from different parts of the United Kingdom to visit the provinces of Canada this month, with a view to investigate and report upon the agricultural resources of the country. All expenses will be defrayed by the Dominion Government, and the mission will occupy about two months.

A noticeable outcome of the existing trade depression is the unusual increase in the number of steerage passengers booked this season from New York for European ports. The passenger traffic of this class is stated to be the heaviest on record.

Kansas women who serve as police justices appear to deal with the tramp question with the Solomonic wisdom of an Eastern cad. One tramp was recently sentenced to two baths a day for ten days and hard labor on the stone pile, with the order that he was to be fed if he worked and starved if he shirked.

The Iron Age

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RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - BUSINESS MANAGER.

American and Foreign Prices

If cheapness were an end devoutly to be hoped for there might be some satisfaction in the achievements of the American iron trade in crowding down values during the past year. In nearly all its leading branches the melancholy record of lowest prices has been attained. The causes which have led to this result may be grouped into two classes: those which are permanent and those which, let it be hoped, are very fugitive. Among the former may be noted the change from iron to steel, which has substituted very largely common for skilled labor, and the improvements in plant and machinery, which have greatly increased the efficiency of labor. The shrinkage in the demand through the monetary troubles has, of course, been the principal factor whose influence must be counted as temporary.

Some time since we drew some comparisons between the prices reached in this country and those prevailing in Europe, which in many respects show some extraordinary facts. Beginning with pig iron, the following comparison of figures is instructive. While local No. 1 foundry is selling at \$13.50 in Chicago, Southern No. 1 is quoted at \$12.75 at Cincinnati, and Standard Pennsylvania is fetching \$14.50 in Philadelphia. Scotch warrants are selling in Glasgow at \$10.20, No. 1 Eglinton is quoted \$10.70, and No. 1 Summerlee and Coltness at \$12.75. In Germany No. 3 foundry is quoted at \$12.20 in the Westphalian district, while foundry iron is selling in the North of France at \$13.75. All these figures look high when compared with \$7.50 for gray forge, \$8.50 for No. 2 and \$9 to \$9.50 for No. 1 at furnaces, Birmingham, Ala. But it costs \$4.01 per ton to land Southern iron in New York, while a few shillings will cover the freight from Glasgow.

Mill iron fetches \$8.25 at furnace in Belgium, \$11.40 in the north of France, and \$8.25 at Middlesborough, England, against \$11.50 to \$12 in Eastern and Western Pennsylvania. It is probable, however, that the foreign quotations are based on a cinder mixed metal, while ours are all ore. Still, the difference is considerable, and with a low cost for puddling and other rolling mill labor, explains some of the very low prices at which finished iron is selling.

In Bessemer pig the differences are much less and they partly account for the fact that when it comes to steel we approach our foreign competitors

more closely. In the Barrow district Bessemer pig costs \$11.15; in Westphalia, Germany, \$12, and in Belgium, \$13.75, as compared with \$12.25 in the Pittsburgh district, and considerably lower figures on Cornwall irons in Eastern Pennsylvania. Naturally, the prices of billets are closer together. Thus, the Barrow district quotes \$20, which looks high when compared with \$17.50 for rails, and the German works ask \$18.50 to \$19, these figures comparing with \$19.75 to \$20, at which business has been done in Pittsburgh lately. It is well known, however, that the English and German works are willing to make very liberal cuts in their prices for the sake of capturing export orders.

It is evident from the data given that where American ironmasters can secure the advantages due to their displacement of skilled labor by machinery, they can come pretty close to their home prices, comparing them with ours at interior points. When it comes to delivering at tidewater the advantages of ocean freights tell. German billets can be landed in New York with the special prices which the foreign makers are willing to accord at close to \$20, while American mills would find it very difficult to go down to \$22.50. It must not be forgotten, too, that we are now suffering from panic prices, which are crowding producers from the ore to the finished article to the wall, day after day, while the foreign works are running along in a tolerably fair way.

In finished iron and steel our high wages tell, in spite of the fact that in many departments we have better machinery. Common bars are selling at Middlesborough at 1 cent per pound. They fetch under the protection of a pool 1.20 cents in Germany and sell at 1.16 cents in the North of France. The Belgians make their "export price," at Antwerp, 0.92 cent per pound. The closest crowding has brought our figures down to, say, 1.40 cents for good refined in Eastern and Western Pennsylvania, while possibly a grade equivalent to that of the foreign makes might be obtained at, say, 1.30 to 1.35 cents at mill. Marked bars in England are 1.35 cents at mill in the Black Country.

Steel beams are selling for the home trade at 0.96 cent in Germany, and iron beams for export at 0.87½ cent at Antwerp, Belgium, and 1.40 cents in Northern France. The lowest which has been done in this country for, it is true, a fine steel beam has been 1.50 cents, Pittsburgh, or, say, 1.70 cents at tidewater. Angles are quoted 1.30 cents in Germany, 1.18 cents in Northern France, 1 cent in Middlesborough and 1.65 to 1.75 cents at mill in this country.

In plates the makers of the Northwest of England quote 1.08 cents for ship plate, while in the Cumberland district boiler plate is at 1.38 cents. This contrasts with 1.50 cents at Eastern and Western Pennsylvania mills for tank plate and 1.60 cents for shell

plates. Hoops in Manchester are quoted 1.28 cents. Here they have sold down to 1.55 cents at Western mill.

Probably the prices which we quote on American material represent the limit of the attainable for a good time to come. They have brought failure to many and distress to practically all of our producers. In the case of the foreign prices they are known to be the result of the operation of pools and combinations in many lines. It is certain that if crowded as we are now, the European could put a very much larger gap between them and us. We insist upon this circumstance because there has been a disposition among some American ironmasters to regard the possibility of foreign competition with indifference. They have achieved a good deal during the past decade, but are still far from the point where they can ignore European makers.

The Foundrymen's Associations.

The foundrymen are taking considerable interest in the two associations which have now been established. It is readily seen, however, that these associations will be largely local in their membership and influence if their meetings are continuously held in the same cities. Both organizations are ambitious of higher honors than this. They seek to take in a wide field, covering States or whole sections of the Union. How to do this is a problem. Members may be gathered in from remote districts, but the meetings would not do them much good if they were not able to attend occasionally. In a paper submitted to the Western Foundrymen's Association, Thos. D. West of Sharpsville, Pa., takes up this question and suggests "A Plan for the Rapid Development of the Foundrymen's Associations," as follows:

1. Retain the Eastern and Western associations as two distinct bodies, the same as they are now managed. Have one joint annual meeting, alternating between Philadelphia and Chicago, under the auspices of each association alternately, the courtesy of the one to be fully reciprocated by the other.

2. Divide territory. All Eastern States, Pennsylvania, West Virginia and Southern States bordering the Atlantic to be under the jurisdiction of the Eastern association. All other States to be tributary to the Western association.

3. Have each organization, every other month, hold its meeting at some point outside of that chosen for its headquarters.

My argument for the first of the above suggestions is this: There being two associations, each with its own headquarters, rivalry for the extension of membership and benefits would exist to a much greater degree than were there only one leading body. Moreover, two sets of high officers would insure a larger number of earnest, enthusiastic workers than could be had were there only one board of officers.

As to the second point: The division of territory, being necessary to avoid conflict in authority, would not only draw the line for fields from which to solicit for the extension of membership, but would make the lay members more interested and active workers than they would be under a *résumé* providing but one main body, with headquarters so far off that they could never hope

to have the time, even if they had the money, to attend its meetings:

3. The two associations holding meetings every other month in different sections of the country, are sure to enlist a membership of earnest workers and secure largely attended meetings, such as it would be impossible to attain under the present system. The territory being divided as proposed, by first holding meetings at the most prominent manufacturing points, we are fairly sure of having in our present membership those who would take an active interest in making their local meetings a success. To insure the attendance of the secretary of each association at the outside meetings in the district tributary to his headquarters, it would be well for the association to defray his traveling expenses, and when the associations become stronger, do likewise with the presidents.

I believe the benefits to be derived from such a plan of organization would soon demonstrate that it is worth the outlay. It makes no difference what plan may be adopted for the promotion of the organizations so well started among foundrymen; but I do feel that before we can make great progress and insure strength and permanency, something must be done to secure the attendance of members who cannot afford the time from their business or incur the expenditure now necessary that they may secure the benefits of meeting with experienced and practical foundrymen.

The proposition for a joint annual meeting is an excellent one and should be carried out. The division of territory appears to be natural, and will doubtless be followed as long as these two associations are actively at work, even if no formal steps were taken to establish a compact. The third suggestion has a very great deal of force in it. The territory covered by the associations is so great that it is not to be expected that members will often travel to Philadelphia or Chicago merely to attend meetings. If, however, these meetings were held every other month in some city outside of Philadelphia or Chicago it is probable that considerable interest might be aroused in that special locality at the time and an interesting and profitable session secured. We have had occasion only recently to suggest to the Eastern association, in reply to the question how to extend the membership in New York, that one of its meetings be held there. But no one can say what the result will really be until the plan is tried. It may be found to work out badly, resulting in a dishearteningly slim attendance through the lack of interest among local foundrymen. The establishment of permanent quarters in a large city in which there are numbers of foundrymen, some of whom can always be relied on to attend, may have decided advantages.

There are some other points that occur in this connection. The fact cannot be overlooked that the success of any organization depends less on the plan on which the organization is conducted than on those who are the leaders in the movement. If the directing minds are of precisely the proper quality for leadership, followers will be found. And in no way can this be so well shown as by persistent, energetic work in the early days of an organization, when its reputation is

being established. The Eastern organization appears to have passed its crucial period. That of the Western association is yet to come. A good start has been made, but interest must be kept up, meetings must not be allowed to pass without some discussions of practical value, and foundrymen must be made to feel that they are losing something when they do not attend. This is the object which should now be most zealously pursued, and the co-operation of the two associations will follow naturally in due time as an outgrowth of the strength of both.

Brown Wire Gun and Smokeless Powder.

Exceedingly interesting and successful experiments were made on Friday, August 18, at the Sandy Hook proving grounds with the Leonard smokeless powder as a charge for the Brown segmental wire gun. The American smokeless powder is the invention of Mason E. Leonard of Virginia, and by its use the highest velocity ever given by a high-power rifle in this country was attained. The Brown gun used has a bore 5 inches in diameter and a length of 19 feet. Fourteen shots in all were fired, beginning with a charge of only 7 pounds and increasing gradually to a 20-pound charge. The 7-pound charge gave the projectile a muzzle velocity of 1720 feet per second, which cannot be equaled by any similar charge of any other known powder. The last shot, however, was the most remarkable. The charge of 20 pounds of Leonard powder discharged an elongated projectile of 62 pounds weight at a muzzle velocity of 2865 feet per second. The experiments were conducted by Lieut. G. N. Whistler of the Fifth U. S. Artillery, in the presence of other ordnance officers and of the respective inventors of the wire gun and the smokeless powder.

Speaking of the experiments, Lieutenant Whistler said at the time: "The Brown gun beat the record of velocity of practical guns by more than 200 feet per second. There was once a gun built in England for the sole purpose of scientific experiments to see at what velocity it was possible for a gun to project a missile. That gun sent a projectile at a velocity of more than 3000 feet per second, but as the gun was 50 feet long it was not a practical one, and the experiment was of no use except as a matter of curiosity. Our experiment this afternoon is a world beater. It is the greatest velocity ever obtained in this country, and for the length of the gun (19 feet) the greatest in the world. And we are not through yet. We ran out of powder. We confidently expect, as soon as we get another supply of smokeless powder, to attain a velocity of 3000 feet per second, and even with our 19-foot practical gun we will beat the English record made by the impracticable experimental 50-foot gun. The Brown segmental wire gun is made to withstand a pressure of 75,000 pounds to the square inch. We propose to fire it at a pressure of 50,000 pounds. This afternoon the full pressure was not attained with only 20 pounds of powder. When we get more powder in a few days and turn on full pressure, as it were, then the naval world will open its eyes and ears. The greatest pressure hitherto used in ordinary guns has been only 37,000 pounds

per square inch. The experiments thus far demonstrate not only the superiority of the Brown segmental gun over all others, but prove that the smokeless powder invented by Leonard, an American, is 40 per cent. more powerful than any foreign powder ever used. With this powder and an ordinary United States field piece having a 3.2-inch caliber and a length of 6 feet, a ball was recently projected at a velocity of 2430 feet per second, which was the best field piece record ever attained. The foreign powder record for a similar piece was only 1947 feet."

Improved Trade in Central Ohio.

Business in that part of Ohio lying between Canton and Cambridge shows a decided improvement this week. At no time during the recent depression has the condition of affairs in this district been very serious. The dull spell lasted only a short time and there was not a heavy falling off in pay rolls. The rolling mills were among the first to sign the wages scale and employees of mills, factories and railroads have never had to wait a day or hour longer than usual for their pay. At Canton the Canton Steel Roofing Company are using their new building and machinery and are getting the full benefit of improved appliances. The building is 600 feet long. This gives exceptional facilities for painting and this company can easily handle several carloads in a ten-hour day. The Berger Mfg. Company, the Kanenberg Roofing Company and all other manufacturers of iron and steel roofing, galvanized cornice, &c., are getting busier day by day. Other industries allied to the iron and steel trade are gradually getting into old form. The Reeves Iron Company, Canal Dover, are giving steady employment to about 500 men, and the blast furnace of the Penn Iron & Coal Company continues to add its quota of steady wage earners. Coal mines and fire-brick yards of the vicinity are keeping busy. The New Philadelphia Iron & Steel Company are running their sheet mills steadily. At this plant repairs are being made gradually by laying off part of the works a few days at a time. The full force of men is about 400. Other industries at this place are doing a good business. At Cambridge the largest establishment is that of the Cambridge Iron & Steel Company; about 300 men are enjoying steady employment in the manufacture of iron and steel sheets, and the finishing touches are being put on the new galvanizing works, upon which no expense has been spared to make it a modern plant. The Cambridge Roofing Company, the Cambridge Foundry Company and the Cambridge Currugating Company are all running full, with good prospects for continuance. All the concerns mentioned in this report are making shipments as fast as the finished product can be prepared.

The extensive coal fields south of Cambridge have been well developed during recent years, but more than ever during the past 12 months. A large tract of coal land has just been purchased and is being developed for the main purpose of securing a permanent supply for the Cambridge rolling mills. There was recently a ripple of excitement over three good gas wells struck by the Pebble Rock Company. It was hoped that this would be available for manufacturing purposes; but the wells and about 1000 acres of territory have been sold to the Cambridge Light &

Heat Company, and Cambridge manufacturers will continue to use coal, which is plentiful and cheap in the neighborhood.

OBITUARY.

PARIS HALDEMAN.

A cable dispatch from London on August 14 announces the death of Paris Haldeman, at one time one of the most widely known iron manufacturers of Pennsylvania. His death occurred on Sunday from the effects of a late attack of paralysis. Mr. Haldeman, who was 62 years of age, had been abroad for his health a couple of years. About a year ago his wife and daughter died in England. He was the youngest son of Henry Haldeman of Conoy township, Lancaster County, and was born on the old family estate there. Most of his life was spent in the iron business, and until April, 1891, he was president of the Chickies Iron Company, at Marietta, where he lived for many years. Mr. Haldeman was a member of the Executive Committee of the American Iron and Steel Association. He was an uncle of Horace L. Haldeman, secretary, treasurer and superintendent of the Chickies Iron Company.

PERSONAL.

Lemuel Bannister, general manager of the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., sailed for Europe last week, to be absent several months.

W. J. Neeson, formerly connected with the Pittsburgh & Lake Erie Railroad, has been appointed agent of the Mahoning & Shenango Valley Iron Manufacturers' Association and will enter upon his duties September 1. His headquarters will be in Youngstown, Ohio, and he will look after the freight interests of the above organization.

Doctor H. Lunge, the famous authority on the manufacture of soda and sulphuric acid, and professor at the Polytechnic School at Zurich, Switzerland, is now in this country.

I. L. Morris has resigned his position as manager of the Peoria Steel & Iron Company of Peoria, Ill.

Alexander Siemens, who was associated with his brother in the experiments with the direct process at Londonderry, N. S., and at Pittsburgh, is one of the delegates to the Electrical Congress at Chicago.

Joseph A. Jackson, superintendent of the National Rolling Mills, McKeesport, Pa., has resigned. His successor is C. I. O'Connor.

G. S. Merwin of Rogers, Brown & Merwin, Pig Iron merchants, Monadnock Building, Chicago, has resumed his duties this week in the active management of the business. He has been absent since early in December, recovering from the effects of an accident, which was reported at the time. His many friends in the trade will be pleased to learn of his complete recovery.

The Columbian Steamship Company, in connection with the Panama Railway and the North American Navigation Company, have issued a new tariff on west-bound shipments, affecting several hundred kinds of manufactured goods. The new rates are very much lower than

have been heretofore in force either by rail or isthmus, and present a reduction of from 40 to 76 per cent. from the latest reduction in rail rates.

Delay of the "Katahdin."

From a Washington press dispatch it appears that the ram "Katahdin," building at the Bath Works in Maine, will be delayed a year before she is commissioned, when she should be ready now. The officials of the department have discovered that by a curious wording of the contract for her construction her armor cannot be delivered until next July, although the completion of the ship was called for this year. How it was possible to finish the vessel six months or more before the department would allow the armor to be placed on her is a question that has not been explained.

The Little Belle Furnace, at Bessemer, Ala., has recently been producing pig iron low in sulphur and silicon, eminently adapted to the manufacture of basic open-hearth steel, as the following analysis recently made by J. H. Pratt, analytical chemist, of this city, shows: Average of 44 analyses—silicon, 0.635; sulphur, 0.651. The following, by the same chemist is the average of 18 analyses of basic open-hearth steel made from Birmingham pig iron: Phosphorus, 0.085 per cent.; sulphur, 0.042 per cent.; manganese, 0.382 per cent.; carbon, 0.098 per cent.

The quickness with which our American hustlers can work when caught in the horns of a dilemma was well illustrated at Muncie, Ind., a few days ago, observes a Western exchange. The material for building 1 mile of electric railway arrived in that city, after having been "lost" on the railroad for 12 days, at 4 o'clock Monday morning. The rails and other materials were unloaded and hauled from the cars, over a mile, where the work of road making began. This was kept up until 12 o'clock the next day, when, after just 32 hours' work, 4800 feet of track had been laid, the track lined up, surfaced, dirt thrown back in, the poles erected, the trolley wires strung, the feeders tapped in and a car started over the track. More than 8000 persons were carried to the baseball game over the road that afternoon.

The Thomas Iron Company of Hokenau, Pa., have paid a dividend of 3 per cent., for the first six months on their capital stock of \$2,500,000. Last year the company paid 8 per cent., and previous to that 10, and as high as 15 per cent. per annum.

The accident at the Lambert & Bishop Wire mill, at Joliet, Ill., belonging to the Consolidated Steel & Wire Company, which occurred on the 19th inst., was not so serious as at first reported in the dispatches. The head of the mud drum of a boiler blew out, killing Geo. Parkins, a carpenter, but Gen. Supt. John Wightman was not fatally injured. He and Manager Corey Robinson were scalded by the escaping steam, but will recover. The mill had been closed for several weeks, and preparations were being made to resume operations. The damage done was but nominal and will not interfere with the starting of the works.

Trade Publications.

WE HAVE RECEIVED from the Westinghouse Electric & Mfg. Company of Pittsburgh two large and handsome catalogues describing and illustrating their electric railway apparatus and standard apparatus made by them. The former contains a sketch of their single reduction motors, multipolar generators and some of the more important apparatus necessary for the car equipment. It is stated that "in the mechanical construction of both motors and generators the question of providing an ample margin of strength above the rated or normal capacity has been carefully considered, and we have not spared material when it was necessary to secure this all important requisite, but have made certain of the best results, even under the severe strains to which apparatus is subject in street railway practice. In electrical design we have combined high efficiency with thorough insulation and good workmanship—a union without which the economical operation of an electric railway plant would be impossible." The second catalogue contains half-tone engravings of standard apparatus made by this company. No description accompanies the cuts, a full explanation of the appliances being published in separate pamphlets.

THE NINTH ANNUAL TRADE CATALOGUE of John Maslin & Son of Jersey City, N. J., has just been issued. This describes very fully the Maslin patent improved automatic steam vacuum pump; vertical, horizontal, hoisting and marine engines; vertical, locomotive and portable boilers; chain blocks, slings, derricks, pulleys, hangers, shafting, &c. The addition of new and improved machinery during the past few months has so increased the facilities of these works that orders can be promptly filled.

WE HAVE RECEIVED from the Jeffrey Mfg. Company of Columbus, Ohio, a catalogue of the steel cable conveyors for long distance conveying, which are used more particularly for conveying solid material of an elongated form. The clamps placed on the cable act as teeth to retain the pulling feature of the wire in pitch with the wheels. The flights may be spaced at any distance apart required. The clamping device is very simple, consisting of two parts fastened securely together by bolts, and when placed in position on the rope will stand the strain common to such machinery. Particular attention has been paid by this company to the pitch of their wheels and rope, the result being that the wheels will not only work successfully when the machinery is new, but will work equally well when the material has lengthened, caused by wear and tear. The catalogue also describes the V, O and U shaped troughs used by them, and illustrates some of the positions in which these conveyors work successfully.

The accuracy of a quotation on sheets made in *The Iron Age*, August 3, has been questioned. Purchases at Ohio mills were made at that time at the following prices:

	Iron.	Steel.
	Cents.	Cents.
64-100 to 71-100 pound per foot.	2.65	2.75
72-100 to 87-100 pound per foot.	2.55	2.65
88-100 to 125-100 pounds per foot.	2.45	2.55
126-100 to 185-100 pounds per foot.	2.35	2.45

The terms were 60 days' note or acceptance, or 2 per cent. discount for cash.

A striking instance of a nuisance being converted into a profit is, says the London *Engineer*, afforded by the new process for extracting sulphur from alkali waste. At Widnes alone 500 acres must have been covered with it to an average depth of 12 feet. These 10,000,000 tons of noxious material have been with great difficulty prevented from being a source of intolerable nuisance throughout a large district, owing to the amount of sulphur contained, and the consequent discharge of sulphureted hydrogen into the air.

MANUFACTURING.

Iron and Steel.

Bellaire Furnace of the Bellaire Nail Works, Bellaire, Ohio, was banked down August 15. The firm have a sufficient amount of Bessemer pig on hand to meet their requirements for some time after their steel plant has been put in operation.

The Erie City Iron Works, Erie, Pa., manufacturers of boilers, are running only four days a week, and if there is not an improvement in business by September 1, the plant will close down entirely for an indefinite period. Should this action become necessary, the firm will retain only enough men to do the shipping and other work that is absolutely necessary.

The Stearns Mfg. Company, Erie, Pa., are operating their plant full time, but with a reduced force. This firm have some work for which their customers are in considerable hurry, but outside of this they are not pressed with orders.

On Monday, August 14, the tube mill of the Tyler Tube & Pipe Company, at Washington, Pa., was put on day turn. This mill will be kept running on day turn until the condition of the trade demands that it be put on night turn also. The rolling mill of this firm is running full time as usual.

Last week the Salem Wire Nail Company, Salem, Ohio, started up their plant at that place on single turn. If trade conditions warrant, the plant will be put on double turn. The nail factory of this firm, located at Findlay, Ohio, is still closed down in all departments, and will remain so for some time to come.

The Valentine Iron Company, owning and operating Bellefonte Furnace, at Bellefonte, Pa., have temporarily closed their iron-ore mines. At present the firm have quite a stock of ore on hand, sufficient to run the furnace for some weeks, and in the midst of the business depression they find it necessary to economize and reduce expenditures as much as possible. Should the industrial depression and financial stringency continue, the firm may later on bank or blow out their blast furnace in order to reduce stocks. The number of men laid off by closing down the ore mines is about 350, and the firm are still giving employment to about 150. The firm have always had a market for their product, but with the wholesale closing of foundries and mills, and shipment being largely curtailed, the firm intend to reduce their output proportionately.

At Pittsburgh last week Alexander Thomas filed his report as auditor appointed to distribute the funds in the hands of Alexander Thomas, assignee of James P. Witherow. The funds were \$125,000 which were derived from the sale of the New Castle plant of the firm to a syndicate of creditors organized under the name of the James P. Witherow Company. After preferred claims had been paid there was \$103,944.72 left. The expenses of the audit were \$2748.06, leaving for distribution among the general creditors \$101,196.66. The amount of the approved indebtedness, exclusive of the preferred claims, is \$268,932.70, making the rate per centum allowed the general creditors 37.6.

Spaulding, Jennings & Co. of Jersey City, crucible steel manufacturers, have closed down indefinitely.

A San Francisco, Cal., journal says that the Pacific Rolling Mill of that city, which annually employs an average of 870 men, now has only 200 men at work.

The Midland Steel Company, Muncie, Ind., started their blooming mill on the 7th and their sheet mills on the 14th of July. They are running double turn. We are authorized to state that their books contain many orders of a pressing nature and the prospects are good for a steady run during the fall months. The town of Muncie, with a population of 20,000, has five rolling mills. It is expected that all will be in operation during this month. A prominent manufacturer states that the supply of natural gas is abundant for all the plants of the district.

The J. P. Hayden Company, Columbus, Ohio, have started their rolling mills and chain works after a stoppage of about eight weeks and will give steady employment to about 400 men.

The South Pittsburg Pipe Works, South Pittsburg, Tenn., closed down last week and will remain idle until the business situation shows decided improvement.

It is stated that preparations are being made to stock the Woodstock Furnaces, at Anniston, Ala., with ore, limestone and charcoal and put the plant in operation.

The annual meeting of the stockholders of the Old Dominion Iron & Nail Works Company was held at their office in Richmond, Va., last week. The president's report showed a large business done in the fiscal year and the finances of the company to be in an excellent condition. All the former officers were re-elected and are as follows: President, Arthur B. Clarke; vice-president, Douglas Baird; secretary, G. W. Catlett. Directors, Capt. Philip Haxall, Dr. E. T. Willis, Meredith F. Montague, Douglas Baird and Arthur B. Clarke.

As soon as the present supply of ore at the Victoria Furnace, at Goshen, Va., is used up the furnace will blow out.

The Roane Iron Company blew out their No. 2 furnace at Rockwood, Tenn., last week and stopped work at the mines for an indefinite period. Mr. Chamberlain, president of the company, states that the temporary suspension of the plant is due to the financial condition of the country and that work will be resumed as soon as it can be done with safety to the company. Work will be continued on the new furnaces in process of construction. About 200 men will be thrown out of employment by the stopping of work at the furnace and mines.

Two meetings of the creditors of the Linden Steel Co., Pittsburgh, were held in the Lewis Block in that city last week. A proposition was received from the firm by which they agreed to pay 20 per cent. of their indebtedness with interest at the end of six months, with 10 per cent. additional with interest every six months thereafter. No definite action has yet been taken looking to the acceptance of this proposition.

Those having the matter in charge of the reorganization of the Pennsylvania Steel Company of Steelton, Pa., and Sparrow's Point, Md., have agreed to increase the indebtedness from \$3,000,000 to \$9,000,000 by the issue of \$6,000,000 more in bonds. Of the \$9,000,000 \$4,000,000 will be reserved by the trustee, \$3,000,000 to be issued only for the purpose of redeeming and discharging the mortgages existing upon the respective properties. The other \$6,000,000 bonds have the privilege at any time within five years from date of issue of conversion into an 8 per cent. preferred stock, non-accumulative, the company reserving the right at any time after the period of five years upon due notice to redeem any portion of the bonds not so converted at 103.

The Advisory Committee appointed by the creditors of Wm. M. Kaufman of the Sheridan furnaces, at Sheridan, Pa., held a conference with the firm last week, and as a result it is probable that a four years' extension will be granted the firm. In case this is done, the two blast furnaces will continue in operation.

The plate mill of the La Belle Iron Works, at Wheeling, W. Va., has been put in operation, and a number of cut nail machines in their nail factory have also been started up.

Lindsay & McCutcheon, owners of Star Iron Works, Allegheny, Pa., signed the Amalgamated Association scale last week and their plant has resumed operations in some departments. This concern manufacture hoop iron and cotton ties, having an annual capacity of 12,000 net tons.

Phillips, Nimick & Co., operating the Sligo Rolling Mills, at Pittsburgh, have signed the Amalgamated Association scale, and their plant will resume operations in a short time, probably this week.

Last week Mitchell, Tranter & Co., with offices at Cincinnati and works at Covington, Ky., and the Licking Rolling Mill Company, with works at Covington, Ky., signed the Amalgamated Association scale.

The Mahoning Valley Iron Company, Youngstown, Ohio, are building a mill on their property at Youngstown, which has heretofore been known as the Grasshopper property, in which the firm propose to erect the 9-inch train from their Youngstown plant and the 12-inch train from their Hubbard plant. The firm have felt the necessity of something of this kind for some years, in order to relieve their somewhat cramped position at both their Hubbard and Youngstown plants. The new mills will have cooling beds of about 200 feet in length, and the firm expect after these improvements have been completed to be able to turn out a much larger tonnage of iron on the two mills above men-

tioned than they have ever done before, especially as in connection with the moving of the trains they are adding many improvements which are strictly modern. The firm do not propose to abandon the Hubbard plant, but it is to be allowed to remain as it is, and it will be put in operation as soon as business warrants.

The plant of the Sharon Iron Company, Limited, at Sharon, Pa., resumed operations on the morning of the 16th inst. in nearly all departments. In the puddling department 20 furnaces were started up.

The Falcon Iron & Nail Company, Niles, Ohio, have about concluded arrangements by which their workmen will agree to accept one-half cash and one-half in scrip in payment for wages until the financial stringency has been removed. In case the employees decide to agree to this arrangement the plant of the concern will be put in operation at an early date, probably this week.

A serious accident occurred last week at Girard Furnace of the Girard Iron Company, Girard, Ohio, making it necessary to blow out the stack for repairs. This furnace is owned by A. M. Byers & Co. of Pittsburgh and much of the product is used by that concern in the manufacture of pipes and tubes.

At the request of creditors, the Lima Steel Casting Company, of Lima, Ohio, have been placed in the hands of a receiver, W. T. Agester being appointed to the position.

On Tuesday, the 15th inst., a reduction of 10 per cent. in wages of blast furnace employees in the Mahoning and Shenango valleys went into effect. At the present time in the Mahoning Valley there are only five blast furnaces in operation, and in the Shenango Valley only three are running.

The Schuylkill Iron Works of Conshohocken, operated by the Alan Wood Company, have announced that on and after September 4 there will be a general reduction in the wages of employees. Puddlers will be reduced from \$4 to \$3.25 per-ton. Laborers will be reduced from \$1.15 to \$1.05 per day.

Notices were posted by the National Tube Works Company, McKeesport, Pa., that on Monday, August 21, a portion of the works will resume at a reduction of wages of from 7½ to 15 per cent. The company expect to resume operations in additional departments within a few days. When operating in full the company employ between 8000 and 9000 men.

The rolling mills of the Springfield Iron Company, Springfield, Ill., which have been idle for several weeks, have resumed work.

Justice Fursman has granted an order allowing Receivers Kemp and Keenan of the Troy Steel & Iron Company to resume work at the Albany Iron Works and at the Rensselaer Iron Works to complete the orders on hand, and also allowing them to sell merchant steel and iron at market rates.

It is reported that T. W. Shipman and E. B. Powell have leased the wire-nail mill property at Belleville, Ill., and will convert it into a plate mill.

The rolling mill of the Columbian Iron Company and the Susquehanna Rolling Mill, at Columbia, Pa., are running.

The Black Diamond Steel Works of Park, Brother & Co., Limited, at Pittsburgh, Pa., have again been put in partial operation after a shut down of one week.

The Midland Steel Company, at Muncie, Ind., signed the Amalgamated Association scale last week.

The Irondale Steel & Iron Company, at Anderson, Ind., signed the Amalgamated Association scale last week, and will start up a number of departments during this week.

The employees of the Keystone Bridge Company, at Pittsburgh, Pa., an identified interest of the Carnegie Steel Company, Limited, have been notified of a 10 per cent. reduction in wages to go into effect on September 1.

The suit of W. J. Rainey, the Connells-ville coke operator, with offices at Cleveland, Ohio, against the Thomas Furnace Company of Niles, Ohio, which has been pending at Cleveland for some time, has been settled out of court, the defendants paying the plaintiff \$12,452.36.

A portion of the plant of the National Tube Works Company, at McKeesport, Pa., resumed operations on Monday morning,

the 21st inst. Wages of employees have been reduced from $7\frac{1}{2}$ to 15 per cent., according to amount earned. It is stated that additional departments at this plant will be put in operation within the next week or two.

Vesta Furnace, at Lower Marietta, Pa., has gone out of blast.

The Brooklyn Wire Nail Company, at Greenpoint, are idle. It is probable that the plant will start up next week. Wages will be lowered.

It is stated that the Iron Gate furnaces, near Clifton Forge, Va., are preparing to go into blast at an early day.

At noon Saturday, August 19, H. O. Crane, secretary and general manager of the Iron-dale Steel & Iron Company, Anderson, Ind., signed the wages scale of the Amalgamated Association and Superintendent T. B. May took immediate steps to commence operations. The product of these mills is about 20 tons of iron and steel sheets per day, used principally for roofing and galvanizing purposes. Mr. May was for many years connected with the Aetna-Standard Iron & Steel Company, Bridgeport, Ohio.

The Radford Pipe & Foundry Company have moved their general offices from Cincinnati to their works at Radford, Va. M. C. Armour is vice president and general manager, Archer Brown of Rogers, Brown & Co. is treasurer, and J. K. Dimmick is superintendent.

William Kemp and James Keenan have been appointed receivers of the Troy Iron & Steel Company of Troy, N. Y. The finishing mills are running; the furnaces, converting works and billet mill are idle.

Contracts have been closed to build a sheet mill for the Los Angeles Iron & Steel Company of Los Angeles, Cal. The persons chiefly interested are J. G. Chamberlain, formerly of the Cherry Valley Iron Company, Leetonia, Ohio, and A. S. Robbins. Local scrap and imported billets are to be the raw materials.

William Shaw has been appointed receiver of the Gilbert Car Company of Troy, N. Y.

The Carlisle Mfg. Company of Carlisle, Pa., closed down their machine shops on August 12.

Machinery.

The Ball Engine Company, Erie, Pa., manufacturers of automatic and cut-off engines, have been operating their plant only five days per week since August 1, and on August 12 the force of men was reduced by the discharge of 50. The trade of this firm is almost entirely with electric lighting and electric railway interests. These industries being very largely based on borrowed capital, were almost immediately affected by the stringency in money matters, putting a stop to many projects and making it dangerous to sell. Of course this affected the business of the Ball Engine Company very materially, but up to this time they have been able to keep running on orders. The variety of sizes that the firm build and the tendency at present to special work prevent the firm from building a considerable stock of engines ahead. They are having at the present time considerable inquiry and expect considerable business during the coming fall, although it is thought it will be confined to moderate requirements. During this fall this firm expect to bring out a line of vertical engines, having already brought out some of the drawings.

The machine shops and foundries in Pittsburgh have reduced wages 10 per cent. It is estimated that the wages of about 8000 men will be affected by the above action. At a meeting of Local Union No. 46, Iron Molders of North America, held in Pittsburgh on Friday evening, August 18, a long discussion was had concerning the above reduction, and it was unanimously decided to reject the proposition to reduce wages. In case the men persist in their refusal to accept the reduction a strike will likely follow.

An effort is being made by the London stockholders of the Town Lands Company of Middlesborough, Ky., to raise funds to complete the South Boston Iron Works at that point. At a recent meeting of the stockholders it was ordered that bonds to the amount of £75,000 be issued, £40,000 of which are to be placed on the market at once. The committee was also authorized to sell £120,000 of treasury stock at such times or on such terms as they deemed proper.

The firm of O'Connell & Rogers, leading dealers in mining, mill and furnace supplies at Chattanooga, Tenn., made an assignment last week, Mr. Rogers being appointed trustee.

Boston Enterprise Mfg. Company, 17 Milk street, Boston, Mass., succeeding Enterprise Mfg. Company, manufacturers of rolled steel forgings and steel balls of all kinds, have been incorporated under the laws of Massachusetts with a paid-up capital of \$20,000. W. A. Dietrick is president and treasurer, Albert M. Bullard, secretary.

The Akron Tool Company of Akron, Ohio, manufacturers of the McNeil patent balanced automatic dump charging barrows, are in receipt of large orders for this style of barrow from the Pittsburgh, Shenango & Lake Erie Railroad Company and the Alabama Midland Railway Company. The firm have also an order from the Cleveland Gas Light & Coke Company for an additional number of these barrows, of extra heavy weight, for use in handling hot coke.

W. T. Agerton has been appointed receiver of the Lima Steel Casting Company.

The Bridgeport Machine Tool Works, at Bridgeport, Conn., will probably close down entirely.

The Atherton Machine Works, at Phoenix, near Tewksbury, Mass., have shut down, and will remain closed indefinitely if business does not improve.

At the works of the Champion Iron Company of Kenton, Ohio, a new foundry building has taken the place of the one destroyed by fire a short time since.

The firm of A. J. Underwood & Co., iron founders, River street, Millbury, Mass., have been dissolved, Mr. Underwood retiring. The firm is now styled Smith & Whitney.

A. & F. Barnes of Rockford, Ill., have resumed operations.

It is reported that the Brown & Sharpe Mfg. Company of Providence, R. I., will start on Monday next.

The Buckeye Engine Company of Salem, Ohio, have announced a reduction of 10 per cent. in wages.

The South Side Foundry Company of Indianapolis, Ind., have assigned.

The Bigelow Boiler Works, near New Haven, have stopped night work.

Warren Webster & Co., late of Philadelphia, are now occupying their new factory and offices at the corner of Elm and Point streets, Camden, N. J., where in future they will manufacture their Webster vacuum feed-water heater and purifier and deal in a line of special steam pumps. They will also push the Williamses vacuum system of steam heating, for which they are the sole licensees for the sale of stationary rights in the United States. Their new building is built of brick and iron, and is spacious and substantial. It occupies a space of 65 x 150 feet and contains three floors, with admirably planned arrangements for the convenient handling of their products in all stages of manufacture. Most of the plant used in their old quarters has been transferred to the new building and supplemented with a complete outfit of new machinery and other appliances, including a large traveling crane built by Maris & Beekley of Philadelphia. A new engine and boiler have been installed, and ample provision has been made for future demands for space and power. Their shipping facilities, both by rail and water, are excellent. At present they are in a position to furnish employment for 50 hands, but this number will probably be doubled before many months. Their export trade, too, is growing and necessitates a good deal of attention. The Webster vacuum feed-water heater has been well received, and about 400 of them are now in operation in steam plants in this and other countries, aggregating over 300,000 horse power. The Williamses vacuum system of steam heating has been installed in about 500 of the largest manufacturing plants and buildings in the country. The firm will introduce specialties from time to time, and are already on the market with their separator for live and exhaust steam under the patent obtained by them in January last.

It is stated that the Buckeye Engine Works, at Salem, Ohio, will not close down, all reports to the contrary notwithstanding.

A. & P. Roberts & Co. of Pencoyd, Philadelphia, have leased the plant of the

Riverside Bridge & Iron Works, at Paterson, N. J., and will continue the same in operation.

The J. I. Case Threshing Machine Company of Racine, Wis., who employ 800 men, have started up a part of their shops, beginning with 20 hands. The plow works have also started with a full force of 200 men.

The H. B. Smith Machine Company, manufacturers of wood-working machinery, at Smithville, N. J., are operating their works to full capacity, and report business in their line very satisfactory.

The molders at the various foundries in Cleveland, Ohio, have decided to accept a 10 per cent. reduction in wages, with the proviso that the old scale be restored when the times become better.

The Edinburgh Foundry & Machine Company of Edinburgh, Ind., have suspended work indefinitely.

The employees of the Griffin Iron Works in Greenville, N. J., numbering about 200, went on strike because their wages were cut 10 per cent. The New Jersey State Board of Arbitration has been asked to take the matter in hand.

The Dickson Mfg. Company of Scranton, Pa., employing 1200 persons in the manufacture of locomotives and mining machinery, have made a 10 per cent. reduction in wages in all departments.

Knowles Steam Pump Works, Warren, Mass., which have been running five days of eight hours weekly, have laid off 180 of their 450 employees.

Miscellaneous.

The coke works of the Oliver Coal & Coke Company in the Connellsville region, an identified interest of the Oliver Iron & Steel Company, were closed down for an indefinite period last week. Thirty new coke ovens were in course of erection at the time of the suspension.

Among recently authorized corporations in Illinois are the following: The Handy Coal Cutter Company, at Peoria; capital stock, \$200,000; for the manufacture of mining machinery and supplies; incorporators, Charles E. Ulrich, Eugene Zimmerman, and James T. Johnson. The Allegheny Foundry Supply Company, at Chicago; capital stock, \$50,000; for the manufacture of foundry facings, blacking, and supplies; incorporators, John S. Griffiths, A. E. Carey, and John M. Marsh.

The Sweet & Clark Company, operating the Marion Malleable Iron Works, after a temporary suspension for repairs, have decided to make the suspension indefinite.

The Manville Covering Company of Norristown, Pa., have not closed down.

Rockford, Ill., is witnessing an industrial awakening, and within a month every one of the old industries will resume operations. The W. F. & John Barnes Company started up on Monday, as did also the Trahern Pump Company. The Nelson Knitting Works will begin on September 4. On the same date the Silver Plate Works, Forest City Furniture Company, Emerson, Talbot & Co. and a number of other concerns will start their wheels going again.

Randolph & Clowes of Waterbury, Conn., have reduced wages 25 cents per day.

Several strikes of the architectural iron workers have been ordered in New York for the purpose of securing a nine-hour work day.

The New York Construction & Supply Company of New York City have been incorporated in Albany, with a capital of \$20,000, to manufacture machinery supplies and deal in general merchandise. The directors are Walter S. Rockwell and Thomas A. Maguire of New York City, and Elmer E. Billow of Chicago.

The new shops which Hoopes & Townsend, manufacturers of bolts and nuts, are erecting at Willow and Thirteenth streets, Philadelphia, will comprise the following structures: Bolt shop, 46 x 202 feet 8 inches; tool repair room, 40 x 65 feet; engine room, 40 x 32 feet; boiler room, 40 x 32 feet; iron storage room, 40 x 108 feet; smith shop, 58 feet 6 inches by 202 feet 8 inches; machine shop, two stories, 40 x 100 feet. When they are completed the works at Wilmington, Del., will be moved to Philadelphia.

The Lakeside Nail Company of Hammond, Ind., employing 800 hands when running full, have started up their mill after a shut down of three months.

It is understood that the Fred J. Meyers Mfg. Company have awarded the contract

for their new shops at East Hamilton, Ohio, to A. Betscher of Hamilton for \$26,000.

The Bellaire Stove Foundry, Wheeling, W. Va., has started up after several weeks' idleness.

The scythe shops of the American Edge Tool Company, at Ballston, N. Y., which were burned last fall and have since been rebuilt, will resume work about September 15, giving employment to about 200 men.

The Boynton Furnace Company of Lafayette, N. J., whose works have been closed for the past few weeks on account of slack business, have started up with a force of 250 men.

The works of the Salem Wire Nail Company of Salem, Ohio, have resumed operations after a shut down of several weeks.

The Marsh Faucet Company, capitalized at \$100,000, have filed articles of incorporation at New Brunswick, N. J.

The Oliver Coke & Furnace Company which is an identified interest of the Oliver Iron & Steel Company, Pittsburgh, posted notices at their coke works in the Connells-ville region last week notifying employees of a general reduction of 12½ per cent., to take effect immediately. The same concern have also made a reduction in the house rents of their employees of 12½ per cent.

The strike at the works of the Watt Mining Car Wheel Company, Barnesville, Ohio, is entirely at an end. Nearly all the old hands are reinstated and others have left the neighborhood. The works are running to their full capacity and shipments are being made to all parts of the United States.

The Salem Mineral Wool Company have been chartered by John A. Bartlett, H. W. Fry and others to build and operate a mineral wool plant at Salem, Va.

The president of the Elliott Car Works at Gadsden, Ala., says that they have more orders and are doing more work than at any time within the past five years. The plant is now running 11½ hours per day.

At present the Youngstown Bridge Company of Youngstown, Ohio, have under construction the largest single pieces of bridge work ever shipped from Youngstown. These consist of three plate girders for a bridge at Duluth, Minn., each measuring 86 feet in length, 8 feet deep, and weighing 30 tons each. In their construction will be used 12 angles, 6 x 6 inches in size and 86 feet long, each weighing 1½ tons. These are said to be the largest angles ever rolled in the United States. These girders will require three flat cars each for transportation.

After many experiments the Central-Hudson Railroad Company have found a method of lighting passenger cars perfectly by electricity. At one end of the car which has been equipped is a dynamo about 4 feet high, which is connected with one of the axles of the car. Near the dynamo is a small storage battery. When the car is in motion the dynamo not only supplies electricity to light the 60 incandescent lamps which are suspended along the sides of the car, but also stores a quantity away for use when the car is not in motion. The dynamo and battery are well secured in a closet, upon the door of which are six large padlocks, which renders it impossible for any person to secure a drawing of the mechanism.

The skylights for the new depot and train sheds of the Boston & Maine Railroad in Boston will be made of wire-glass, a new combination, which consists of a sheet of glass of any size or thickness having embedded in its center a sheet of wire netting of any required size of mesh of wire or of any desired design. The contract for furnishing these skylights was awarded to Frank Schuman, manager of the American Wire Glass Mfg. Company of Philadelphia, and Thomas B. Inness of the Manhattan Equipment Company of New York. This order amounts to over 150,000 square feet of glass, and is probably the largest single order ever placed.

TRADE REPORT

As the precursor of better times to come in mercantile circles, the improved feeling in the chief financial center may be heartily welcomed. But as yet manufacturers and merchants have little occasion to rejoice over better banking facilities, and until that comes no marked improvement in the volume of trade need be expected. It is undoubtedly nearer, and that in itself is pleasant encouragement.

In the Iron trade the general impression is that we must face a protracted period of low prices and only slowly expanding volume of business. The fact that a number of important plants are being operated by receivers in itself is regarded as likely to have an adverse effect. There is a growing feeling that the system is unjust to solvent concerns, since the competition is unfair.

Another factor which is pointed out as likely to hold down values is that mill after mill will make special efforts, as a preliminary to resumption, to secure good "backbone" orders, which are usually relied upon to secure at least partial employment for a series of months. This is particularly true where specifications must first be received before operations can begin.

In staple articles, distributed widely and in small quantities, where, therefore, stocks play an important part, the reserves of this character have been drawn down to a very low point. It is in these lines that the necessities of consumers are even now being felt and in which an upward tendency may be first expected to develop.

The outlook for raw materials like Ore and Coke looks gloomy, because in them the unprecedented dullness in the Rail trade, with its important tonnage, tells most.

The current production of Soft Steel is very light, but the consumption, with the Rod mills still idle and the Bar mills running very slack, is also limited.

The canceling of orders for Copper by manufacturers has been the feature recently in that department of the metal trade. The present price, 9½¢ for Lake Copper, is crowding the record. Tin has been given a little twist, being marked up to 18.80¢. Lead has rallied under the influence of a lessened production and smaller imports of Mexican Ore. Spelter continues very dull.

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street, CHICAGO, August 23, 1898.

The Iron trade is very quiet, the only signs of importance being in the hardware trade, which is picking up a little with the approach of fall. Hopes of better times are based on this turn of the season and the usual preparations for winter. There is general confidence in a good volume of business in October, if not before.

Pig Iron.—Very few transactions are noted, but among them was a sale of 300 tons Lake Superior Charcoal. This would not usually be worth mentioning, but in the present state of the market is of some importance. There is considerable inquiry for Coke Pig from country trade, but only in a general way. Consumers seem merely to be keeping in touch with the market so that they can close quickly in case they should suddenly need Iron, as they are running with very light stocks. Now that production has been so heavily reduced, many are fearing a sharp reaction from dullness as soon as financial questions are settled. The Malleable Castings syndicate will need from 40,000 to 60,000 tons of Lake Superior Charcoal, and the members of the trade are wondering where they will get it, as the stock furnaces are pretty well sold, and very few furnaces are running or expect to run. We repeat quotations, which are subject to concessions for prompt cash and immediate shipment:

Lake Superior Charcoal.....	\$16.00	@	\$16.25
Local Coke Foundry, No. 1....	13.50	@	14.00
Local Coke Foundry, No. 2....	12.75	@	13.00
Local Coke Foundry, No. 3....	12.50	@	12.75
Local Scotch.....	14.00	@	15.00
Ohio Strog Softeners.....	15.75	@	16.25
Southern Silvery, No. 1.....	14.00	@	14.50
Southern Silvery, No. 2.....	14.00	@	14.00
Southern Coke, No. 2.....	12.60	@	12.85
Southern Coke, No. 3.....	12.10	@	12.25
Southern, No. 1 Soft.....	12.60	@	12.85
Southern, No. 2 Soft.....	12.00	@	12.25
Southern Gray Forge.....	11.50	@	12.00
Tennessee Charcoal, No. 1....	16.00	@	16.50
Alabama Car Wheel.....	18.00	@	18.85
Coke Bessemer.....	14.50	@	15.00
Hocking Valley, No. 1.....	15.25	@	15.50
Jackson County Silvery.....	18.50	@	17.00

Bars.—Mill business has been light since last report. The Springfield Iron Company started up Monday for a short run. This and one or two mills in Indiana and part of the Milwaukee works of the Illinois Steel Company are the only Bar mills now running that supply this territory, yet they cannot get enough orders for early delivery to keep well employed. Mill lots of Bar Iron may be quoted 1.47½¢ @ 1.50¢, with half extras, Chicago delivery; Soft Steel, 1.60¢ @ 1.65¢. Contracts for Soft Steel for season delivery have been made at lower rates, but prices are quite firm for immediate delivery. Jobbers report a steady demand for small lots from stock, but the volume of such business is not so large as it should be with so many mills so long idle. Quotations are 1.70¢ @ 1.75¢ for Iron or Steel.

Merchant Steel.—More season contracts have been placed by Agricultural Implement makers, whose purchases of specialties have been quite large of late. Their business seems to be assured by the excellent crops, and they are buying as if financial troubles were unknown. Further contracts are in sight. Mill lots are quoted as follows, Chicago delivery: Smooth-Finished Machinery Steel, 1.90¢ @ 2¢; Open-Hearth Spring and Smooth-Finished Tire, 2¢ @ 2.10¢; Iron-Finished Steel Tire, 1.70¢; Ordinary Tool Steel, 6¢ @ 7¢; Special Tool Steel, 12¢ and upward.

Rails and Track Supplies.—Some small sales of Steel Rails are reported, but the inquiry has recently improved and may result in somewhat better business. Prices are as before: \$30 @ \$32 for Rails, 1.60¢ @ 1.65¢ for Splice Bars, 2.55¢ @ 2.60¢ for Track Bolts with Hexagon Nuts, and 1.85¢ @ 1.95¢ for Spikes.

Other Manufactured Iron and Steel—Structural Material is selling in small lots only. Plates are still quiet, with store business falling off. Black Sheets have sold moderately to out-of-town buyers. Galvanized iron is in better demand, but mainly because large consumers are drawing on warehouse stocks. Prices of mill shipments, Chicago delivery, may be quoted as follows: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢; Tank Steel, 1.75¢ @ 1.85¢; Shell Steel, 2.05¢ @ 2.15¢; Flange Steel, 2.20¢ @ 2.30¢; High Grade Fire Box, 2.75¢ @ 5¢; No. 27 Common Black Sheets, 2.80¢ @ 2.83¢; Juniata Galvanized Iron, 70 and 10 and 5 % discount; Sheet Copper, 30 and 35 % off, according to quantity.

Old Rails and Car Wheels.—Old Iron Rails are very plentiful, but there are no buyers. Railroads are anxious to sell, but ask cash, and that is prohibitory. They are worth \$14. @ \$15, according to conditions. The best offer for short lengths of Old Steel Rails is \$9, while long lengths might bring \$11 @ \$12. Old Car Wheels are an unnecessary quantity. A consumer might be asked \$14.50 if a carload were really needed, but a seller hunting a buyer might not get more than \$13 @ \$13.50.

Scrap.—This part of the market is lifeless. Dealers make absolutely no bids on Scrap lists put out by the railroads. Consumers are not buying. Nominal selling prices per net ton are as follows: No. 1 Forge, \$10.50; No. 1 Mill, \$8; Sheet Iron, \$5; Pipes and Flues, \$7.75; Axles, \$16; Horseshoes, \$12; Fish Plates, \$14.50; Spikes and Bolts, \$12.50; Cast Borings, \$5.25; Wrought Turnings, \$7.25; Axle Turnings, \$9; Heavy Cast, \$8 @ \$9; Stove Plate, \$8; Malleable Cast, \$8; Mixed Steel, \$9, gross ton; Leaf Steel, \$16.

Metals.—Prices are unchanged, at 10.25¢ for Lake Copper, 9.75¢ for Casting Copper, and 3.75¢ for Spelter, all in carloads.

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, August 23, 1893.

Pig Iron.—The feeling noted in last week's report that the general conditions were improving continues to gain ground daily, and to-day a feeling of cheerfulness prevails. Sales are limited and prices are steady, without, however, showing any disposition to advance. The decrease in production continues and with any kind of a fair demand prices would readily firm up. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	\$12.25 @ \$13.50
Southern Coke, No. 2 Foundry	11.75 @ 12.00
Southern Coke, No. 3 Foundry	11.25 @ 11.50
Southern Gray Forge	10.75 @ 11.00
Southern Car Wheel	18.00 @ 19.00
Lake Superior Car Wheel ..	16.75 @ 17.25
Ohio Softeners	15.75 @ 16.50
Missouri Charcoal, No. 1 Foundry	12.75 @ 13.25

Bar Iron.—An increased demand is noted in Bar Iron. Mills are nearly all closed down and jobbers are unable to keep a full assortment. Mills quote 1.45¢ @ 1.50¢, f.o.b. cars East St. Louis, according to quantity. Jobbers ask 1.60¢ for lots from store.

Barb Wire.—Trade is dull and prices remain unchanged, as follows: Painted, \$1.95 @ \$2 in carload lots to jobbers; Galvanized, 40¢ per hundredweight additional. Jobbers quote \$2.10 for small lots of Painted.

Wire Nails.—There is no improvement in the demand, although prices appear to be somewhat firmer. Mills quote \$1.50 in carload quantities. Jobbers ask \$1.60.

Rails and Track Supplies.—Steel Rails are neglected at \$30.50 @ \$31. Track Supplies are unchanged, as follows: Splice Bars, 1.70¢; Spikes, 1.90¢ @ 2¢; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Old Iron Rails are quoted at \$16.

Pig Lead.—There is no large business doing in this metal, but prices are firmer, as holders refuse to sell at last week's prices. A few odd lots have changed hands at 3.10¢, which is the price to-day.

Spelter.—This metal appears to be top heavy. Offerings are made at 3.45¢ @ 3.50¢ without attracting buyers. The settlement of the coal strike will only tend to further depress the market.

The American Wire Company of Cleveland, manufacturers of Wire Rods and Wire, have established a branch of office in the Bank of Commerce Building in charge of T. W. Freeman.

Philadelphia.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, Pa., August 22, 1893.

The condition of the market is not essentially different to what it was a week ago. The trade are getting somewhat more accustomed to the new conditions, and to that extent the feeling is more settled, but it cannot be said that the demand is increasing or that prices are firmer. The immediate outlook is not encouraging, in view of the fact that many of the largest concerns are making great reductions in their working force, with strong probabilities that this feature will become more marked as the season advances. It is out of the question to expect large orders in times like these, so that all that there will be to depend upon will be the small day to day demand. This will doubtless assume importance after awhile, as the business of the country is not going to cease entirely, although it may have to be built up as it has been before, from small beginnings. So far as regards this vicinity, matters are in fairly good condition, but in view of the scarcity of money and the uncertainties of the future, there are very few concerns that have not gone on short time. Locomotive works, car shops, engineering establishments, stove foundries, hardware manufacturers, all departments, in fact, are either reducing their number of hands, or what is the same thing, reducing the number of working hours, and in some cases are taking still more radical measures by a complete suspension of work for a week, two weeks, and in some instances indefinitely. Naturally this has a depressing influence on the Iron market,

but as production was cut down in anticipation of some such contingency, the effect has been pretty well discounted. It is not impossible that some quick changes may be made, but meanwhile there is nothing in sight beyond what we have already outlined.

Pig Iron.—The movement is extremely light, and, while quotations are nominally unchanged, there is no difficulty in securing special rates for special terms. That is to say, cash or short-time buyers can shade prices 25¢ to 50¢ per ton; but on ordinary time sales quotations are pretty well maintained. Sales are all in small lots, there being no disposition to buy in advance of requirements and no possibility of marketing large lots unless on terms which holders are not willing to accept. Ordinary time sales are usually at about \$12.50 @ \$13, delivered, for Gray Forge, \$13 @ \$13.50 for Plain No. 2, \$13.75 @ \$14.25 for No. 2x and \$14.50 @ \$15 for No. 1x.

Steel Billets.—Sales were made last week at prices varying from \$22.65 to \$22.90, delivered, for Western Steel, but purchases then made appear to have filled up all the vacant spaces, inasmuch as there is no further inquiry except for small lots, special qualities, and of course at special prices. First-class buyers would probably be able to place orders at still lower figures, say \$22.50, if they were to make the right kind of a bid, but for the present they are holding off.

Finished Material.—All branches are suffering from the general falling off in consumption. Some mills are doing fairly, others are doing little or nothing; but, on an average, not more than one-third or one-half time is being made. Large consumers are practically out of the market, but as that throws more work on the smaller concerns, it is not unlikely that things will soon begin to pick up a little. There is no possibility of anything like general activity, but business is not going to stop clean off, and as stocks have been greatly reduced, it is quite likely that current requirements will soon make themselves felt. Prices are, of course, all at sixes and sevens. For small lots current quotations are as near as possible to the following figures, but on a good sized order, or for special terms of payment, $\frac{1}{16}$ ¢ @ $\frac{1}{8}$ ¢ less would be promptly taken; perhaps not by any mill, but if one did not, another would:

Grooved Skelp, delivered	1.50¢ @ 1.55¢
Best Refined Bars	1.57½¢ @ 1.61½¢
At interior points	1.50¢ @ 1.55¢
Tank Steel	1.70¢ @ 1.72½¢
Heavy Plates	1.70¢ @ 1.75¢
Shell	1.80¢ @ 1.90¢
Flange	2.10¢ @ 2.25¢

Louisville.

LOUISVILLE, KY., August 21, 1893

The conditions of the Iron market are very much the same that have existed for some time, save that there is a tendency on the part of purchasers to buy more freely, recognizing that the low stocks will lead to higher prices with even moderate buying. One transaction amounting to 3000 tons, taken in connection with the inquiry for a large tonnage from capitalists seeking a safe investment, is an indication that the future will shortly show increased business followed by an advance in prices. The purchase of Iron at present prices is absolutely safe, as same can be bought for less than Iron can be pro-

duced, and it is a property that always can be sold and there is no cause to feel anxiety from fire or depreciation from age, and both consumers and investors will find the present moment more favorable than they are likely to meet with in years to come. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry.	\$12.50 @ \$13.00
Southern Coke, No. 2 Foundry.	11.25 @ 11.75
Southern Coke, No. 3 Foundry.	10.75 @ 11.00
Southern Coke, Gray Forge....	10.25 @ 10.50
Southern Car Wheel.....	17.50 @ 17.75
Southern Charcoal, No. 1 Foundry....	15.00 @ 16.00

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, }
PITTSBURGH, August 22, 1893. }

With the exception that there has been a partial resumption of operations in some of the mills that have been idle more or less since July 1, there is no change in the situation to note this week. Among the mills that were altogether idle and have again started up some departments may be mentioned: Park, Brother & Co., Limited; Philips, Nimick & Co., Lindsay & McCutcheon, National Tube Works Company, Duquesne Tube Works Company, and a few concerns outside of the Pittsburgh district. While none of these concerns are running full, nor have they sufficient business to insure steady operations, it is hoped that enough orders will come in to prevent any further suspension of operations. At a meeting of creditors held here yesterday it was decided to grant an extension to the Linden Steel Company, and it is expected that their plant will resume operations in some departments within a short time. A statement showing the assets and liabilities of the Oliver Iron & Steel Company is now being prepared and will be presented to the creditors at a meeting to be held in a few days. On crude Iron and Steel prices are the same as one week ago, while on some finished products there is a firmer tendency, caused by the rapid depletion of stocks.

Pig Iron.—Production of Pig Iron in this district has been further lessened by the banking down of another Isabella stack. Should it become necessary to shut down the Edgar Thomson Steel Works, which now seems probable, it is likely that additional Edgar Thomson furnaces will close. A very small amount of Pig Iron is selling, but with the increased activity among the mills referred to above, it is thought demand will show some improvement before a great while. We quote as follows:

Neutral Gray Forge....	\$11.75 @ \$12.00, cash.
All-Ore Mill.....	12.00 @ 12.25 "
Bessemer Pig.....	12.50 @ 12.75 "
No. 1 Foundry.....	13.00 @ 13.25 "
No. 2 Foundry.....	12.00 @ 12.25 "
Charcoal Foundry No. 1	15.00 @ 16.00 "
Charcoal Foundry No. 2	14.00 @ 15.00 "

We note a sale of 1000 tons of Bessemer, for balance of the year delivery, at a price equal to about \$12.75, Pittsburgh.

Billets.—Beyond a few sales of Billets, in small quantities for immediate requirements, there is nothing doing. Only two concerns in this city are operating their Bessemer plants, and these are working to about half capacity. In the Wheeling district the mills are still idle. The market is fairly represented by the quotation of \$20.50 at makers' mill.

Steel Rails.—It is likely that the Edgar Thomson plant will close be-

tween now and September 1. Old orders have been thoroughly cleaned up, and no new ones are being received. The plant has been working about half time for a month or more.

Ferromanganese.—There is nothing doing and we make nominal quotation of \$57 for domestic, f.o.b. cars Pittsburgh.

Muck Bars.—There is nothing doing. Outside brands have sold as low as \$21 @ \$21.50 in this district. City-made Muck Bars are held at \$22 @ \$22.50, delivered at buyers' mill.

Structural Material.—Some bridge work has been placed during the past week or two at prices said to be the lowest yet named. The two leading makers here are securing sufficient tonnage to keep their mills moderately employed. The third mill continues idle, with no immediate signs of resumption. Prices asked are about as follows: Beams up to 15 inches, 1.50¢ @ 1.60¢, f.o.b. cars Pittsburgh; Angles and Universal Plates, 1.60¢ @ 1.70¢; Tees, 1.60¢ @ 1.70¢, and Z-Bars 1.60¢ @ 1.70¢.

Plates.—There is a fair amount of business going, one local concern booking some fair-sized orders for Tank Steel last week. Prices continue low and will remain so until the demand shows material improvement. We quote as follows: Tank, 1.60¢ @ 1.65¢; Shell, 1.65¢ @ 1.75¢; Flange, 1.75¢ @ 1.90¢; Ordinary Fire Box, 2.25¢ @ 2.50¢; Special, 3¢ @ 3.50¢.

Rods.—The mills continue closed and there is nothing doing. We make nominal quotations of \$28 @ \$28.50, Pittsburgh, in the entire absence of sales.

Wire and Cut Nails.—The idleness of the Wire Nail mills is approaching the end of the second month. Stocks are much reduced and broken, and some complaint is heard from customers owing to the failure of mills to make shipments as called for in contracts. The demand has picked up considerably lately, and in some cases slightly better prices are being obtained. We repeat quotations of \$1.50, Pittsburgh or Cleveland, in carload lots. A better demand is also reported for Cut Nails, and prices are showing a firmer tendency. We quote at \$1.05 @ \$1.10 base in carload lots at factory, with the usual advances for less quantities.

Merchant Steel.—Business is moderately active, and while some season contracts continue to be placed at intervals, the volume of business is much smaller than last year. The Linden Steel Company have been granted an extension. We quote Machinery Steel at 1.90¢ @ 2¢, according to order; Open-Hearth Spring and Tire at 1.90¢ @ 2.10¢; Ordinary Tool Steel, 5½¢ and upward; special brands, 15¢ and upward.

Barb Wire.—The long shut down of the mills is telling seriously on stocks, and local buyers have been compelled to enter other markets in order to meet the pressing wants of customers. Although having some old contracts at low prices, they have been compelled to pay considerably higher figures to get material. We have advanced quotations and now quote Four-Point Galvanized Wire at \$2.35 @ \$2.40 in carload lots, and \$2.50 @ \$2.55 in less quantities. For Painted, 40¢ less than above prices. Plain Wire is in active demand, and we quote Nos. 6 to 9 at \$1.65 in carload lots, and Nos. 10 and 11 \$1.75, with 10¢ advance for less quantities.

Bars.—We can report a little more activity among the mills, and prospects for the future are better. Of course the demand is not heavy, but it is better than it was, and with jobbers' stock considerably reduced, makers will be disappointed if the demand does not show considerable improvement before long. Prices are not any lower, and, if anything, are showing a firmer tendency. We quote Steel Bars at 1.50¢ @ 1.55¢. In the Valley Bars are held at 1.40¢ @ 1.45¢.

Sheets.—Business continues quiet, and while some mills have a fair amount of business, others are closed entirely. We quote No. 24 Common Iron Sheets at 2.45¢, No. 26, 2.55¢, and No. 27 at 2.65¢, with \$2 per ton additional for Soft Steel Sheets.

Pipes and Tubes.—Some departments of the plant of the National Tube Works Company, at McKeesport, Pa., have been started up, and the same is true of Duquesne Tube Works Company, at Duquesne. There is a fair demand for the smaller sizes, but the larger sizes are almost entirely neglected. Prices continue irregular, depending altogether on the size of the order and terms of payment.

Coke.—For the week ending August 12 only 4622 ovens in the Connellsville region were in blast, and 12,711 were idle, with a total estimated production for the week of 37,585 tons, showing a falling off over the previous week of 11,925 tons. We continue to quote Furnace Coke at \$1.25 in tons of 2000 lb, f.o.b. cars in Connellsville region. Foundry Coke is held at \$1.50 to dealers and \$1.65 to consumers.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., }
CINCINNATI, August 23, 1893. }

There is little if anything of an encouraging nature in the Iron trade, and while the volume of business is exceedingly light, lower prices have been accepted for Southern Iron than ever before. Southern Coke Foundry No. 2 has sold as low as \$8.50 and No. 3 \$7.50, Gray Forge \$7.25 and Mottled \$7, spot cash, on this basis, f.o.b. Birmingham. It is evident that these prices are below the cost of production, but that cuts no figure when the cash is offered. There is some little inquiry for miscellaneous forward delivery, but it is not entertained on any such basis. Some factories are not offering to sell Pig Iron at all, but are devoting their energies to settlements. Collections as a rule are poor enough, but there are exceptional cases where payments are being made with a reasonable degree of promptness. The financial difficulties of course dominate the whole trade, and all eyes are turned to Congress for inaugurating measures of relief, but under the most favorable circumstances it cannot reasonably be expected that there will be a speedy recuperation in general trade or in the Iron business. Pig Iron can now be bought at such low prices that it is worth the effort of all who will require it in the early future to secure it now. We quote as follows:

Foundry.

Southern Coke, No. 1.....	\$12.75 @ \$13.00
Southern Coke, No. 2.....	10.75 @ 11.00
Southern Coke No. 3.....	10.25 @ 10.50
Ohio Soft Stone Coal, No. 1....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 2....	14.50 @ 14.75
Lake Superior Coke No. 1.....	15.00 @ 15.25
Lake Superior Coke No. 2.....	14.00 @ 14.25
Hanging Rock Charcoal, No. 1..	18.50 @ 19.00
Hanging Rock Charcoal, No. 2..	17.50 @ 18.00
Tennessee Charcoal, No. 1.....	14.00 @ 14.25
Tennessee Charcoal, No. 2.....	13.00 @ 13.25

Forge.

Gray Forge	10.00 @	10.25
Mottled Coke	9.75 @	10.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	17.75 @	18.00
Lake Superior Car Wheel and Malleable	17.00 @	17.25

Metal Market.

Copper.—Somewhat unusual conditions have prevailed the past week and the market has been very uneven in consequence, with the final outcome such as would indicate that best efforts in the direction of maintaining prices have been futile. Considerable Copper of one kind or other has been taken for shipment to Europe and the report has circulated that surplus stocks of a prominent producer have been about all cleaned up. Against this is a well-authenticated report that a number of home consumers, after deferring acceptance of Copper tendered on contracts, finally canceled the same and settled by paying differences between original purchase prices and 9½¢ for Lake Superior Ingot, 9¼¢ for Electrolytic and 9¢ @ 9¼¢ for ordinary casting brands. Those figures subsequently came out as a reflection of true market value, and in connection with offers on the Metal Exchange at 9.60¢ for October-November delivery imparted a weak undertone. For the moment the market is a very uncertain one, with general financial conditions a drawback that offsets the intended effect of reduced production and quite heavy exports.

Pig Tin.—Despite a steady downward movement in London that resulted finally in about £1 ½ ton decline in prices, there has been a quite sharp advance in the New York market, with August delivery moved up to 18.80¢ ½ lb, against 18.30¢ a week ago. The London price, with duty added, would make the cost of importation several cents above local selling rates and fluctuation in the foreign market, therefore, has had little or no direct influence. However, a new feature has developed in the form of reduction in the margin of difference between prices for current month and later deliveries in this market, the deduction from which is that unless nicely timed manipulation is under way, some conditions, money most likely, have caused more anxiety to sell for October and later delivery. The peculiar state of affairs has checked speculative venture and it is the general report that purchases by dealers and consumers have been on a very moderate scale. At the close the price for spot stock receded to 18.75¢ on actual sale.

Pig Lead.—Prices for common domestic have moved up from 3.30¢ to 3.45¢, with transactions of less than 1000 tons here during the week, and the market closes very firm. The last sales were at the highest price and involved about 300 tons. Curtailment of output in the West and very light receipts of Mexican Silver Lead Ores figure with some prominence as factors in bringing about the advance. Indeed, they probably did more than regular trade demand in that direction, not only here but in Western markets. At the close there were reports of 3.50¢ having been bid for one or two carloads on the spot.

Spelter.—Ordinary brands of Western have been offered at as low as 3.70¢, delivered here and in this vicinity, without stimulating business. Some brands that are rather above the average may

be secured at 3.75¢. In short, the market is weak and dull, with little sign of probable turn for the better in the immediate future unless production be considerably curtailed.

Antimony.—Sales are moderate, but the business passing is at about former prices. We quote at 9¼¢ @ 9½¢ for Hallett's, 10¼¢ @ 10½¢ for L. X., and 10¾¢ @ 10½¢ for Cookson's in round lots.

Tin Plate.—Light-weight Cokes for prompt delivery have met with somewhat better sale. Otherwise no improvement is perceptible outside of slightly more inquiry for futures, due to the curtailment of Welsh production. Prices are no higher, but, upon the whole, seem to be rather steadier than they were a week ago. Spot quotations are about as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.20; J. B. grade, do., \$5.30; Bessemer full weight, \$5.25; light weights, \$4.85 @ \$4.87½ for 100 lb, \$4.80 @ \$4.82½ for 95 lb, \$4.75 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75. Charcoals—Melyn grade, IC, \$6.35 @ \$6.37½; Crosses, \$8; Allaway grade, IC, \$5.60; Crosses, \$6.75; Grange grade, IC, \$5.70; Crosses, \$6.85. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.35; do., 20 x 28, \$15; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.10 @ \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.32½ @ \$5.35; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.87½; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.87½; do., 20 x 28, \$8.90.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, August 23, 1893. }

Pig Iron.—Practically those who must sell in order to meet engagements are in control of the market. Some very low offers have been made by Southern furnaces, and have to some extent been followed by Northern makers. It is hinted that those in control of the management of some of the Standard Eastern Pennsylvania makes are considering the question of lowering prices. We quote Northern brands \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.25 @ \$14.25 for No. 1; \$12.25 @ \$13.25 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$12.25 @ \$13 for No. 1 Soft. Gray Forge is \$12.25 @ \$12.

Spiegeleisen and Ferromanganese.—There has been no business. Ferromanganese is nominally \$55 @ \$56 at tidewater.

Billets and Rods.—The market is very dull. We quote nominally: Domestic Billets, \$22.75 @ \$24, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$30 @ \$31, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—None of the Eastern mills report any new business.

Track Material.—We quote: Spikes, 1.70¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered.

Manufactured Iron and Steel.—Business is extremely dull. There is

only one architectural job of any magnitude in sight. We quote: Beams up to 15-inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.60¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.60¢; Soft Steel Bars are 1.50¢ @ 1.70¢; Scrap Axles are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axles, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 75¢ @ 85¢ ½ bundle, at mill.

Merchant Steel.—Some very low figures are being made, and in some cases sellers are giving away the whole of the extras.

Old Material.—We quote nominally Old Iron Rails at about \$15 @ \$15.50; Old Steel Rails, \$12.50 @ \$13; No. 1 Wrought Scrap Iron at \$14 @ \$14.50, and Car Wheels at \$11.50 @ \$12.

The Troy Steel & Iron Company announce that they are in a position to execute promptly any orders for Merchant Steel, special Iron, Rivets, and Bessemer and Foundry Pig Iron. W. L. Stroud is the New York representative.

* Charles Hubbard & Co., Pig Iron merchants, of New York, have called a meeting of their creditors for the 25th inst.

Financial.

The situation in the financial world during the past week has shown some decidedly better features. There appears to be a gradual return of confidence, which is reflected in a clearer atmosphere in the money and stock markets. The improvement is attributable mainly to three things—namely, the more encouraging bank statement issued on Saturday, the greatly improved outlook at Washington for a speedy repeal of the silver-purchase law and the continued heavy importations of gold, which, together with an added bank circulation, have eased the strain caused by the general dearth of currency by increasing the amount of available ready money. The demand for currency continues brisk, nevertheless, and one or two New York banks were reported to be charging their customers a premium on this medium. A novelty, showing the tendency of banks in this direction, was a notice issued by a Clearing House bank on Tuesday to the effect that for the present separate accounts would be kept for deposits in checks and in cash, and only cash depositors would be paid in cash. The premium charged by brokers for currency has fluctuated between 2% and 3½% during the week, falling to the lower rate at Tuesday's closing, with every indication of a further drop. Many financial authorities believe that the counter trade in currency is almost played out, and that cash will return to par within a few days. The premium on gold to arrive dropped as low as 1%, with offers of less than 1% made. Spot gold is said to have been offered to banks by brokers at 1½% and 1% commission. A large amount of the currency now being disposed of by brokers is said to have been requisitioned by institutions and firms financing the moving of the crops.

Banks reported on Tuesday the shipments of notes and coin to the country were very heavy, evidently for a similar purpose and for the liquidation of pay-rolls. Certified checks for small sums are being largely used in many places for local payments of wages, &c. There is, however, little indication that confidence has revived to the extent of extracting hoarded money. This evil must still prevail to an enormous degree, or the added volume of coin thrown into circulation would ere this have improved the currency situation to a far greater extent than is as yet the case. In a great measure this hoarding of funds has been the cause of the continued maintenance of the premium for currency and gold.

Saturday's statement of the Associated Banks was the first that could be called "favorable" in many weeks, in that it showed an increase in surplus of \$4,499,575 in lawful money, bringing down the reserve deficit to \$12,045,800. A decrease in loans to the extent of \$5,255,500 is explained to have been brought about by the imports of specie from abroad, as it represents the liquidation of accommodations to bankers who secured gold on the other side and imported it. The other features of the statement were a decrease in legal tenders of \$703,700; a contraction of deposits to the extent of \$1,901,100, and an increased circulation of \$702,200. The inward gold movement still continues, but with the lowering of the premium on currency and an expectation that the Bank of England will today raise its discount rate to 5%, it is probable that the inflow may be checked. For the last few days the gold ordered from abroad has fallen off considerably in amount. The value of gold imports since July 15 has, nevertheless, reached the sum of over \$33,000,000, while nearly \$7,000,000 more is now afloat, making a total of \$40,000,000 thrown into circulation during the last four or five weeks. This great volume of coin has been apparently scattered far and wide, and although it cannot be accounted for in the statements of New York banks, it has undoubtedly gone where funds were most urgently needed, and its effect may be seen in the easing of the financial stringency in the interior. A great part doubtless has also found its way into the keeping of trust companies and safe deposit vaults.

In the general trade situation a satisfactory feature was the further increase in the volume and value of exports and a corresponding falling off in imports. *Bradstreet's* reports a further decrease in the number of failures for last week, namely 409, against 474 during the previous week. No concern of first-rate importance was included in the list. A number of the suspended banks have resumed, and some encouragement may also be taken from the numerous reports of industries resuming operations in various parts of the country. Still the tale of idle mills and factories and unemployed workers is distressingly large. Many believe, however, that this condition of affairs is even now on the mend, and that with silver legislation assured, confidence will return and a good fall trade will develop after all. The interruption of industry, nevertheless, is still very serious, and the reduction in the purchasing power of the people has gone so far that it will take, under the best conditions, a considerable time for a full recovery of prosperity. The amount of Clearing House loan certificates now outstanding for the New York banks is \$37,880,000,

more having been issued during the present week. At the Boston Clearing House a further issue of certificates has brought the amount outstanding up to \$11,195,000. Railroad earnings decreased 12.3% for the first week of August, and 16.3% for the second week. The decrease in Western railroads is said to be due to the almost complete paralysis of freight traffic in the wheat region.

In the loan market money on call to borrowers on stock collateral has ranged between 2 and 8%, reaching the latter rate during a flurry on Tuesday, when for some reason money loans were called and the rate marked up. The closing rate on Wednesday evening was 3%. Time money does not yet show any softening tendency, the request being active and the supply very meager. Nominal quotations for time loans are 6% on choice collateral, but a large commission in addition is indispensable for obtaining accommodation. Mercantile paper continues quiet, with some good names pressed for sale. Business among the banks is at an average of 15%. Foreign exchange has been fairly active, but rates declined steadily as the premium on gold receded. Actual business was done on Wednesday at 4.81 @ 4.81½ for 60 days; 4.86 @ 4.86½ for demand; 4.87 @ 4.87½ for cables, and 4.80 @ 4.81 for commercial. Domestic exchange is quoted as follows: New Orleans, commercial 2.50 @ 4.00 discount, bank nominal; Charleston, buying ½ @ ½ discount, selling par; San Francisco, sight 10 premium, telegraph 20 premium; Savannah, buying 1½ discount, selling par; Chicago, nominally ½ @ 1 discount; Boston, 1.50 premium for cash.

Wall street has felt the better influences before alluded to. The doings of the legislators at Washington have had a marked effect upon the course of business on the Stock Exchange, where a decidedly more healthy feeling has developed.

Transactions have been light and confined mainly to a few leading industrial securities. Quotations, are, however, higher than a week ago almost along the whole line of stocks. The principal feature of the week has probably been the general covering of short contracts. The following list shows the fluctuations in prices of leading stocks since Thursday, August 17, the closing prices being those for Wednesday, August 23:

	High- est.	Low- est.	Closing Aug. 23
American Sugar Ref.	75¾	71¼	73%
Atchison, Topeka & S. Fe 16	16	14½	15
Balt. & Ohio.....	65¼	64¾	64
Chicago Gas.....	53	48¾	48%
Chic. & N. W.....	95¼	92¾	94¾
C., B. & Q.....	78¾	73¾	75¾
Chicago, Milwaukee & St. Paul.....	53%	50¾	52¾
Chic., Rock Isd. & Paci- fic.....	59¾	55¾	57¾
Del., Lack. & W.....	135¾	134	134
Genl. Electric.....	41¾	36	38
Lake Shore.....	114¾	111¼	113¾
Louisville and Nashville. 55¼	52¾	53¾	53¾
Manhattan.....	112¾	106¼	111¾
Missouri Pacific.....	22¾	19¾	20¾
Minnesota Iron, asked.....			60
Nat. Lead, common.....	25¾	22¾	24½
N. Y. Central.....	99¾	97	97¾
N. Y., L. E. & Western. 12¾	11¼	11¾	11¾
Northern Pacific, pref....	21½	20¾	18¾
Northern Pacific, com- mon.....	4¾	3¾	4
Richmond & West Pt. Term.	1¾	1¼	1½
St. Paul & Omaha.....	29½	27½	29½
Union Pacific.....	18¾	16¾	17¾
Western Union.....	78¾	75¼	76¾

The Government bond market is steadier and stronger. Sales of coupon 4s on Tuesday were made at 111½ @ 112¼. The railroad and miscellaneous bond market has continued quiet and

irregular, on the whole, with a more favorable movement on Tuesday, business being well distributed. Bar silver in London advanced to 34½d. per ounce; in New York 76¼¢. Silver certificates dull and strong at 76 bid. Some considerable shipments of silver have been made during the week, and a good demand is reported from London for the East. In response to a resolution of inquiry on the subject of silver purchases under the act of 1890, Secretary Carlisle sent to the House of Representatives on Tuesday a letter setting forth the following facts:

From August 13, 1890, to August 16, 1893, the department purchased 161,521,000 fine ounces, costing \$150,669,450. The highest price paid was \$1.20½ an ounce, on August 20, 1890; the lowest 69.6¢ an ounce, on July 24, 1893.

Treasury notes to the amount of \$150,115,985 have been issued in payment of silver bullion, of which \$714,636 have been redeemed in standard silver dollars and retired since August 3, 1893. Up to August 1, 1893, \$49,184,160 Treasury notes have been redeemed in gold. Thirty-six million eighty-seven thousand one hundred and eighty-five standard dollars have been coined from bullion purchased under the act of 1890. On August 14 the Government owned of silver purchased under the act of 1890, 133,161,375 ounces, costing \$121,217,677.

Rumors are being circulated to the effect that an important coal road is in danger of going into the hands of receivers.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, August 23, 1893.

The market for Pig Tin has been inactive. There was a slight advance in prices early in the week on the strength of local buying orders, but subsequent free selling by importers and dealers caused a sharp reaction, prompts selling at £76. 15/. Purchases at the decline have been moderate. The stoppage of Tin-Plate works has prompted some consumers to resell the metal, which fact added to the depression. Transactions to-day in Straits were at £76. 15/ @ £77 for prompts and £77 @ £77. 5/ for three months' futures.

Copper prices improved somewhat after the circulation of the fortnightly returns, Merchant Bar prompts selling at £41. 6/3 on Friday. Since then there has been a gradual decline. Speculation was hampered by fear of stringent money and absence of more favorable reports from America. The decrease in the visible supply during the first half of the month is attributed to absence of new supplies from Spain. Late sales of furnace material include 100 tons ordinary Montana Matte, at 8/6; 400 tons ditto, at 8/4½; 1400 tons Argentiferous ditto, at 8/6; 1000 tons Anaconda Argentiferous at 8/6. To-day's quotations on Merchant Bars are £41 for prompts, and £41. 12/6 for three months' futures. Best Selected English, £45. 10/.

Business in Tin Plate has been mod-

erate. The enforced closing of works in consequence of the coal strikes hampers business. Makers are firmer on prices, but buyers are unwilling to respond. Canadian business continues good, but is the exception. Frisco purchases are not up to the average. Stocks at Swansea amount to 236,000 boxes, against 268 000 boxes last week. Liverpool prices are as follows:

IC Charcoal, Alloway grade.....12/9 @ 13/3
IC Bessemer Steel, Coke finish.11/9 @ 12/
IC Siemens ".....12/0 @ 12/3
IC Coke, B. V. grade, 14 x 20.....11/8 @ 11/9
Charcoal Terne, Dean grade.....11/6 @ 11/9

Spelter is quieter, and the price has dropped to £17. 2/6 for ordinary Silesian. There is no inquiry from the Continent.

Pig Lead is quoted at £9. 7/6 @ £10 for Soft Spanish, with market quiet, but steady.

In the Iron and Steel trades business has continued slow and prices have undergone very little change, despite somewhat wide fluctuations in warrants. Last sales of warrants were at 42/6 @ 42/7 for Scotch, 35/3 @ 35/4½ for Cleveland, and 45/4½ for Hematite.

Three vessels of the new navy will be ready for their official speed trials next month. They are the triple-screw cruiser "Columbia," built at Philadelphia; the "Montgomery," at Baltimore, and the gunboat "Castine." The only other ship that will be ready for trial this year is the "Marblehead," completing at New York. Nearly all the ships provided for by Congress will be in commission or launched in the next two years, and after that, unless additional ships are authorized, there will be a lack of trials and launches for some years to come. Cramp has now three vessels on the stocks and two on the water fitting out. The San Francisco works will launch one ship in November, and have one more under way. The Norfolk and New York yards still have two ships each under construction.

The Aschman Steel Casting Company, Sharon, Pa., manufacturers of open-hearth steel castings, have been compelled to close down their works temporarily with unfinished orders on hand, for the reason that their customers are not prepared to pay for goods in currency and there was no other course for the firm to take. However, owing to the resumption of operations of a number of Pittsburgh mills, and with indications pointing to an improvement in the money market, the concern expect to start up again in a short time.

The accumulations of merchandise in New York bonded warehouses at the end of July were beyond all precedent. Merchants who never before placed goods in bond are doing so now, and the accumulations are increasing to such an extent that the regular storehouses are packed and additional quarters have to be secured. As compared with a year ago the value of bonded merchandise has increased \$8,492,023. Difficulty in obtaining currency to pay the duties is given as the principal cause of this state of things.

The question of money for moving the grain crops is now the all-important one in the Western and Southern States.

Modern Furnace Management.

In the course of the discussion on the paper by E. C. Potter on "American Blast Furnace Practice," read before the American Institute of Mining Engineers, T. W. Robinson of the Colorado Fuel & Iron Company, Pueblo, Col., presented some data relating to the operations of that plant. The dimensions of the three furnaces are given in the following table :

	No. 1.	No. 2.	No. 3.
Cubic feet capacity.....	11,900	11,000
Height of stack.....	75 ft.	75 ft.	75 ft.
Diameter of bosh.....	18 ft.	18—10 ft.	17 ft.
Height of bosh.....	31—8 ft.	30—6 ft.	25 ft.
Angle of bosh.....	79½	79½	78
Diameter of hearth.....	9 ft.	10 ft.	9 ft. 6 in.
Diameter of stock line.....	16 ft.	14 ft. 6 in.	14 ft.
Diameter of bell.....	9 ft. 7 in.	8 ft. 4 in.	11 ft.
Number of tuyeres.....	7	8	7
Size of tuyeres.....	5 in.	5 in.	6 in.
Height of tuyeres from hearth.....	6 ft.	5 ft. 6 in.	6 ft.

Mr. Robinson contrasts as follows the results obtained under the management of what he calls the old and the new schools:

agement of the company are a guarantee of their strength. The directors are Edwin A. Stevens, George E. Weed, William Gardner, John B. Roach,

Records of Pueblo Furnaces.

Record.....	Old school.		New school.	
	A.	B.	C.	D.
Furnace.....	No. 1.	No. 2.	No. 2.	No. 3.
Date of best month.....	Oct., 1890.	July, 1892.	Dec., 1892.	Jan., 1893.
Tons of product in best month.....	2,385	2,444	3,582	4,497
Tons of product in best week of best month.....	626	679	788	1,082
Tons of product in best day of best month.....	97	105½	140	180
Pounds of coke per ton iron.....	2,965	2,418	2,345
Pounds of limestone per ton iron.....	2,015	1,763	1,450	1,378
Average heat of blast, degrees F.....	770	No record.	1,018	1,223
Ore mixture.....				
Orient, per cent.....	50.0	65.7	64.80	46.03
Calumet, per cent.....	12.5	21.5	26.50	53.97
Brescia, per cent.....	31.2	0.5	8.70
Morning Glory, per cent.....	6.3	12.3

The striking contrast between product and fuel and flux consumption will be observed.

William Rowland, James F. Cox and C. D. Mosher.

To obviate the expenditure of time and money in scraping off the oil that finds its way from the condensers and feed water into marine boilers, a simple remedy is mentioned in *Industry* of San Francisco. According to that journal, J. L. Heald claims that all that is required is to put into the boilers some redwood sawdust, which by attrition cuts off the oil, and by a superior affinity absorbs it, leaving the whole as a loose granular deposit in the bottom of the boilers. This fact was discovered by an experiment at the Starr Flour Mills, near the Heald works, where a battery of boilers badly oil-coated were perfectly cleaned in a few days' time, with no expense or detention whatever.

When it was announced some time ago, says the *Marine Review*, that the New York Ship Building & Engine Company had been organized under the laws of New Jersey, it was not generally understood that this company are intending to construct high-speed torpedo boats, yachts and other speedy craft, entering the same kind of business as Yarrow, Thornycroft and others on the other side of the ocean. It would seem that there is room for such enterprise, the more so on account of the semi-official announcement that the new concern will be supported by the navy,

Citizens of Colorado claim that even if she were to lose her silver-mining industry she would continue to be one of the most prosperous of States. Her advantages in agriculture are very great, and fruit can be raised in immense quantities. Manufactures would be introduced, and the gold-mining industry could be extended.

Glass curtains, observes *Inventions* of London, are a novelty in art industry for house furnishings. They are in colored glass, and have the effect, when closed, of stained glass. They consist of a series of little squares of colored glass, each set in a small zinc frame, the squares being attached to each other at the four corners by little S-shaped hooks. We are told that they can be as easily taken down and moved as any other curtains, and, in case of changing from one size of window to another, can easily be enlarged or decreased in size by the addition or subtraction of a certain number of squares. They are also easily cleaned, and one of their particular attractions is said to be cheapness. They are now being shown at the Palais Royal, Paris.

Cables announce that the Harvey plate tested by the Italian Government has been successful.

HARDWARE.

Condition of Trade.

ALL CLASSES OF TRADE are pursuing the conservative policy which they have followed for some time. Retailers and jobbers are ordering only in small quantities to keep up their assortments, and manufacturers continue to curtail their production to the requirements of the immediate future. Many are still closed down, and those who are running are usually on short time. A tendency in the direction of the curtailment of credits is clearly manifested and little effort is making to sell goods, and travelers who are on the road are sending in small orders.

Chicago.

(By Telegraph.)

Orders for Shelf Hardware have recently increased considerably, but they are all small. This shows that merchants are only keeping up assortments and are not yet prepared to order for stock. The larger volume of business from this accumulation of small orders, however, has greatly encouraged the jobbers. They are looking forward confidently to a good trade during the fall months, especially if the currency question is settled by Congress within a reasonable time. Some very conservative jobbers go so far as to predict decided activity in trade after this happens, because crops are good and farmers are in better financial condition than ever before, and will be good customers of the retail Hardware merchants. Stocks in the latter's hands are so light that any demand at all must lead to important buying from jobbers and manufacturers.

St. Louis.

(By Telegraph.)

Jobbers of Hardware report considerable improvement during the past week. Salesmen are sending in larger orders, and collections are improving daily. Their stocks in many lines are broken and will need replenishing, and as they have been watching for the first appearance of improvement it is likely the manufacturers will soon hear from them. The corn crops of Iowa and Nebraska will be heavy and good prices are expected. The Southern trade, which depends largely upon the cotton crop, will be good, as large crops will be had, and fair prices are expected. A few orders are being received for Heavy Hardware, which is expected to improve as the season advances. Collections, as stated above, are improving daily.

Notes on Prices.

Wire Nails.—An improvement in inquiries has been noticed during the week. Stocks in the hands of the trade are light, and still more so in the hands of manufacturers, whose assortments are generally broken. The price is firm at \$1.50 for carload lots at mill for any orders to be shipped after September 1, and it is the impression in the trade that if the condition of business warrants it the makers are getting into a position to be able to make a further advance. Small lots in New York are held at \$1.65.

Chicago, by Telegraph.—Some Wire-Nail manufacturers report continued good demand, but others are not so favored. Buyers are evidently waiting to see whether the arrangements now being consummated by the makers will really hold them together. The proof of this will be advanced prices maintained rigidly by everybody. Thus far such a condition has not been realized. Some quote \$1.60, Chicago, but others have not changed from \$1.50. Perhaps the coming week may bring them closer together. Some of the factories have started up part of their machines to fill broken assortments, but there are few, if any, that will run full handed for some time. Jobbers quote small lots from stock \$1.55 to \$1.60.

Cut Nails.—While transactions have been small there is a noticeable improvement in inquiries. The quotation remains unchanged at \$1.05 for carload lots at mill, and although some sales have been made at lower prices, the market is stronger, in sympathy with Wire Nails.

Chicago, by Telegraph.—Cut Steel Nails have not kept up the pace with which they started off last week, but business is not as dull as it was before the spurt. Nails are being called for quite steadily and specifications accompany the orders. Prices are unchanged at \$1.20 to \$1.25, for factory lots. Jobbers quote \$1.30 for small lots from stock.

Barb Wire.—There is little to note in this market, and quotations remain nominally at \$2.45 to \$2.50 for carload lots at mill for Four-Point Galvanized, with the usual advance for small lots from store.

Chicago, by Telegraph.—Inquiries are increasing and manufacturers report many of them resulting in orders. They hope that the dull season has at length ended for this year and that business

will steadily improve. Stocks are very light in manufacturers' hands and for immediate shipment they ask \$2.50 to \$2.60 for Galvanized. Jobbers quote small lots of Galvanized from stock at \$2.60.

Kodak Rat Trap.—The Kodak Rat Trap, manufactured by the Waddell Wooden Ware Works, Greenfield, Ohio, which was illustrated in our last issue, is sold to the trade at \$2.25 per dozen.

Magic Columbian Lock.—This Lock was recently illustrated in our columns. It is put on the market by the Magic Introduction Company, 321 Broadway, New York, and is sold to the trade at 75 cents per dozen.

Magic Gas Lighter.—Magic Introduction Company, 321 Broadway, New York, are putting this article on the market. The Gas Lighter was described in our issue August 10. The device is sold to the trade at \$4 per dozen, or \$42 per gross.

Glass.—Developments of the past week have emphasized the fact that the demand for American Glass is not large enough to warrant an early start of the factories, although assortments of single-strength Glass at factories are reported as being broken. A feature of the situation is the selling of foreign Glass by importers at prices under those made by the National Window Glass Company to buyers other than members. This price is reported as being from 80 and 10 per cent. discount to 80 and 20 per cent. discount, according to quantity. The stocks of Plate Glass at factories are being reduced, though the amount of Glass in manufacturers' hands is great enough to supply demands for some time to come. Quotations remain unchanged on all lines of Glass.

Hardware Board of Trade Petition.

THE PETITION urging the repeal of the Sherman silver bill and signed by the Hardware and metal dealers of New York was presented to Congress on the 16th inst. by the Hon. William J. Coombs in an able speech, which he introduced by sending the leading editorial article in our issue of the 3d inst. to be read from the Speaker's desk.

THE Screw manufacturing business carried on at 205 Quarry street, Philadelphia, by the late Franklin S. Miles will be continued by his estate under the management of B. F. Miles, a son of the deceased, who has been for many years connected with the business.

Retail Dealers' Protective Association.

THE FOLLOWING CALL for a meeting of the retail Hardware dealers of the United States to discuss the advisability of forming a National Protective Association and other matters of interest to the trade has been issued by S. S. Bryan, secretary of the Pennsylvania Retail Hardware Dealers' Association:

To the Retail Hardware Trade of the United States:

Feeling that the time has arrived when some action is necessary to protect ourselves as retail dealers in Hardware from the inroads which manufacturers and jobbers are making on our trade, we invite you to be present at a meeting of the Retail Hardware Dealers of the United States, to be held in Chicago, Wednesday, September 20, 1893, the exact place to be hereafter named. At this meeting will be discussed the advisability of forming a protective association, and other matters of interest to the trade.

The attendance at this meeting will in no way commit you to join if you do not see proper.

ORR & LOCKETT HARDWARE COMPANY, Chicago, Ill.

BULLARD & GORMLEY, Chicago, Ill.

HODGE & HOMER, Chicago, Ill.

S. J. STEBBINS, Chicago, Ill.

DAVIS, HUNT & Co., Cleveland, Ohio.

NORTHWESTERN HARDWARE COMPANY, St. Paul, Minn.

W. K. MORISON & Co., Minneapolis, Minn.

STEBBINS & Co., Rochester, Minn.

MOUND CITY HARDWARE COMPANY, St. Louis, Mo.

IRVING A. SIBLEY, South Bend, Ind.

SPRINGFIELD HARDWARE COMPANY, Springfield, Ohio.

TALLMADGE HARDWARE COMPANY, Columbus, Ohio.

J. B. KAERCHER, Pittsburgh, Pa.

SAMUEL MCKNIGHT, Allegheny, Pa.

STEINER & VOEGHTLY, Allegheny, Pa.

A. B. NEYHART, Williamsport, Pa.

J. P. FRAZIER, Franklin, Pa.

C. J. KIRK, New Castle, Pa.

H. W. PICKETT, Warren, Pa.

M. H. CLARK, Jamestown, N. Y.

D. C. WELLER, Erie, Pa.

D. ARTHUR GILL, Meadville, Pa.

JOHN S. LESLIE, Sharon, Pa.

R. L. KERNOCHAN, Titusville, Pa.

S. S. BRYAN, Titusville, Pa.

It is desired to have as large a representation as possible. It is especially requested that all who expect to attend will notify at once Wm. T. Humes, care Orr & Lockett Hardware Company, Chicago, Ill., in order that proper arrangements can be made for the meeting.

If for any reason you are prevented from attending, please send in your name for enrollment should it be deemed wise to organize. This will be a great assistance to those having the matter in charge.

Additional Steamer Service to the River Plate.

PAUL F. GERHARD & CO., 19 Whitehall street, New York, have lately been made the freight agents for the Lamport & Holt line of steamers to Montevideo, Buenos Ayres and other ports on the river Plate and its tributaries. The first steamer will be the Bellova, of about 4000 tons cargo capacity, scheduled to sail from Martin's Stores, Brooklyn, September 25. It is the intention to have monthly sailings, and keep certain steamers regularly on the line plying back and

forth. This enterprise is in the same hands as the Brazilian line recently inaugurated to take the place vacated by the U. S. & Brazil Mail S. S. Co., and while new, in both instances from this country, has long been established from Liverpool and Antwerp. The agents in South America will be the same concerns who have represented the European lines for years. The general agents are Busk & Jevons, Produce Exchange Building, New York.

Export Notes.

HENRY JACOBY of Jacoby & Wester, 33 Murray street, New York, who sailed for Europe on the "Paris," June 27, arrived back on the "Spree," August 10. He visited parts of England and Belgium and Germany very thoroughly. This house import fine Cutlery and Surgical Instruments, much of which they manufacture.

Mecke & Co., 97-99 Water street, New York, who for 12 years have done an export and import trade with the West Indies, Central and South America and China, encouraged by the recent growth of transit facilities in the way of steamship lines to South Africa, have opened a sample room in Cape Town, Cape Colony, in charge of Lorsch & Thompson, who will act as their agents at that point, soliciting orders from all the leading points in the South African colonies. They will deal in all kinds of American produce and manufactures, keeping their agents abroad posted on the latest information concerning the markets in this country. This department here will be under the immediate supervision of F. W. Lotz.

H. F. Sise, 114 Chambers street, reports an excellent export trade in Fork, Axe and other handles, through the London market.

W. B. Fox & Bro., New York, have a consignment of Mining Machinery aggregating 9 tons, shipped recently from Chicago for use in the Kimberly mines, in the Transvaal, South Africa, which will go by Norton & Son's August steamer, "Constance."

A New York export house dealing largely with Cuba and South American countries says that a number of Havana merchants recently here, with memoranda for purchases usually made abroad, all left their orders for certain classes of Iron materials in this market.

R. E. Dietz Company, New York and Chicago, Manufacturers of commercial, railroad and other Lamps and Oil Stoves, have issued an illustrated catalogue of their goods in the Spanish language for distribution largely in Mexico, Central and South America and the West Indies, although suitable for any market where that language is spoken. This pamphlet of 111 pages calls attention to a large assortment of tubular

Lamps and Lanterns, embracing dash, fire department, side, hand and socket, street, hanging, car, square, triangular and government Lamps. Also marine and bridge signal Lamps, conductors', police, pocket and trade Lanterns. A good line of oil cooking and heating stoves is likewise given. This volume is similar to the one printed in English some time ago, except the language.

Shipping Directions.

OUR ATTENTION is called to the frequency with which merchants neglect to accompany mail orders for goods with explicit shipping directions. Orders of this kind are often hurriedly written, and, as the merchant has been buying goods from the same firm for years, he has no thought but that its members are familiar with the route by which his goods are shipped; or he may add, "ship same as last." This is probably more annoying than if no shipping directions were given, as it indicates that the merchant has a decided preference as to the route by which the goods are to be shipped, and yet gives no specific directions on this point. The shipping clerk is obliged to search through perhaps six months' business to find how the merchant's last order was shipped, and at a time when he can ill afford to give the attention required. Again, the clerk is apt to have no intimation of how goods are to be shipped until the goods packed ready for shipment are turned over to him for making out the bill of lading. Perhaps 50 or 100 other bills of goods are to be gotten off the same day, so the one entailing the extra amount of labor is laid aside until he has more time. The merchant, in such a case, is displeased because the goods are not promptly shipped. Very frequently there are two stations of the same name in the same State, in which case it would be an advantage to have the county mentioned. In other instances, where goods are ordered by a customer living at a certain post office address whose shipping point is elsewhere, according to the guide used by the shipping clerk, the goods would be shipped to a certain railroad station. The customer, however, might prefer, on account of the better condition of roads or for other reasons, to have the goods shipped to a station other than that mentioned in the shipping guide.

It is suggested by a large wholesale concern in Philadelphia, in connection with this subject, that it would be an excellent idea for customers in every instance to put on their letter heads the name of the city, county and the State in which they live; and also, if they desire goods shipped to a certain point to have this, too, printed on the letter heads. They state that they occasionally receive letters from customers at the top of whose letter heads are printed the names of the railroads on which they are located, all of which is a decided advantage to the house

shipping the goods, saving the annoyance of having goods go to a wrong town, and also saving considerable time in looking up shipping directions. It would be still better if merchants would have order blanks printed with ink that would copy in a letter book, and use copying ink in writing orders, so that a complete record of each order could be found at any time by referring to the letter book. Orders given to traveling men, as well as those sent by mail direct to the house, should be made out on an order blank and copied. At the head of the order blank should be printed the name of the town and county, the railroad or boat route by which the goods are to be sent, and, if by boat, whether the goods are to be insured or not. The terms upon which the merchant wishes to purchase the goods should also be mentioned. All these directions should be given on each order, so that each order will be understood by itself without the necessity of referring to a previous one. The goods ordered should be designated by the catalogue number, or, if no number is given, the size, quality and price of the article should be mentioned. In ordering special goods it is well to insure prompt shipment by adding the word "preferred," "or similar," thus allowing the jobber or manufacturer to substitute such goods as he may, in his judgment, think will be acceptable to the merchant. In a word, the shipping directions and order for the goods should be so plainly given that they cannot be misunderstood.

Trade Items.

GEORGE E. AUSTIN, New York manager of the Imperial Rubber Company, 134 Liberty street, who went to Europe late in July on a business and pleasure trip, is expected back about September 1.

ANNOUNCEMENT is made that the business of the late M. W. Robinson has been incorporated under the laws of the State of New York and will be carried on as heretofore at 79 Chambers street, New York. It is stated that the company have become the sole owners of all the business and assets of the Davis Level & Tool Company, formerly of Springfield, Mass., including all patents, trade-marks, patterns and good will. Their factory, removed to 28 South Sixth street, Brooklyn, has been furnished with entirely new machinery and tools and is now, after the brief delay incident to removal, again producing goods.

W. D. DANA, formerly with Douglass Axe Company, and well known in the trade, will assume the general management of Warren Axe & Tool Company's business, at Warren, Pa., about September 1.

CAPITAL MACHINE TOOL COMPANY, Auburn, N. Y., call attention in their advertisement in this issue to their line of Electric Vises, a description of which appeared in our columns some time since. This Vise was patented December 27, 1892, and is put on the market with special claims as to the rapidity and promptness of its operation.

HENRY C. SQUIRE, 178 Broadway, New York, dealer in Guns, Ammunition, Sporting and Athletic Goods generally, announces a radical reduction

in the price of the Imperial Bicycle, for which he is agent in New York and vicinity. This wheel, formerly sold at \$150, is offered at \$100, and attention is called to its being a high-grade machine, with ball bearings throughout, and dust proof. It can be had in four styles.

ELSEWHERE in this issue Shoenberger & Co., Juniata Iron & Steel Works, Pittsburgh, Pa., direct the attention of the trade to their Extra Swaged, Roadster and Government Pattern Horse and Mule Shoes made from special soft steel. The fact is fully recognized that steel is fast taking the place of iron for nearly all purposes, and in the Horseshoe trade the steel Shoes have already assumed a very important position. The makers emphasize the claim that not only is steel found to be superior to iron in the manufacture of Horseshoes, but that it makes a lighter and neater Shoe, giving the buyer more Shoes to the keg and resulting in cheaper Horseshoes to the user. Shoenberger & Co. request the trade to correspond with them for information and prices or to apply to jobbers and dealers who handle their goods.

E. T. FRAM of the Keystone Lock Works, Lancaster, Pa., manufacturer of Padlocks, has taken advantage of the dull summer months to entirely remodel his large factory buildings and add to his plant a complete outfit of tools and machinery made after special designs of his own and embodying the latest ideas in this class of machinery. He has also just completed an addition to his brass and bronze foundry, 60 x 42 feet, and added eight new furnaces. These improvements will materially increase the capacity of the works and insure prompt shipment of all orders.

Permanent Steamship Service to the River Plate.

EDWIN N. NORTON, senior member of Norton & Son, 90 Wall street, has just completed a flying trip to London, which has resulted in the closing of a 21-year contract with Bucknall Bros. of that city, placing the Norton line of steamers to the River Plate on a permanent basis. The following steamers have been allocated to this service by Bucknall Bros., who are veterans in the steamship business, from their large fleet, pending the building of new steamers, which, we are told, will be of most modern type, specially constructed to meet the requirements of this trade. They are the "Etona," "Manitoba," "Merida," "Endeavour," "Mt. Lebanon," "Tropea," "Basuto" and "Delcomyn," having an aggregate cargo-carrying capacity of upward of 30,000 tons. In addition to merchandise, passengers and mail will be carried, and the vessels will ply back and forth at regular intervals of about two weeks. Heretofore the steamships of this line, which has been started within the year, have loaded here and sought such employment as offered for any port, on arrival out. Now they will bring us staples from Argentine and Uruguay, and take back manufactured goods. The ports of call will be Montevideo, Buenos Ayres, Rosario, Colastine, La Plata, Santa Fé, Bahia Blanca, &c. Norton & Son will act as managers in New York, and have also a controlling interest in the line.

THE 250 MOLDERS employed in the foundries of Sargent & Co., at New Haven, Conn., have been notified that, until further notice, the foundries will be operated only three days a week.

Safe Business.

BY T. W. F.

SUPPOSE that three Hardware merchants are doing business with the same amount of capital, under the same expenses, but with different results. A, with a capital of \$2500, turns his capital three times during the year resulting in sales of \$7500; with expenses amounting to \$1132.50. The expenses may consist of rent, clerk hire, freight, cartage, advertising, light, fuel, insurance, interest on capital at 6 per cent., postage, taxes and sundries, not including bad debts. The goods have been marked to yield a gross profit of 30 per cent., or \$2250. After deducting the expenses from the gross profits, \$1117.50 remains for personal expenses and clear gain. The ratio of expense to the sales in this case is a fraction over 15 per cent. B, with the same amount of capital also marks his goods to yield a gross profit of 30 per cent., but the capital is turned but two and a half times during the year, resulting in sales of \$6250. Deducting \$1132.50 for expenses, from \$1875, which represents the gross profits, \$742.50 remains for personal expenses. The ratio of expense to the sales is here a fraction over 18 per cent.

C, with the same amount of capital, expenses and goods yielding the same percentage of gross profits, turns his capital but twice, showing \$5000 as his year's sales. His gross profits are \$1500, leaving, after deducting expenses, \$367.50 for personal expenses. Here the ratio of expense to the sales is a fraction over 22 per cent. A, shows a satisfactory business; B, a business that might be considered satisfactory for a poor year; but C is running his business at a loss, as the average family cannot live on \$367.50 a year, and the capital would have to be drawn upon to make up the difference. It will be seen that the percentage of expenses increases as the sales diminish, and that 30 per cent. profit is a fair average at which to mark goods. A business should increase from year to year, and as it increases the expenses may be increased by adding more or better help, better appliances for doing business, &c.; but the expenses should be kept down so as to bear the same ratio to the sales as formerly. In B's business the limits have been reached, both in the amount of expenses and smallness of sales; and to live anything but a hand-to-mouth existence the sales must be increased or the expenses reduced.

The interest on the capital would be a fair amount of increase in capital for the coming year, which a growing business will demand. It is desirable to invest the net gains in some other way than by returning it to the business as increased capital year by year; for should adversity overtake the merchant, outside means would be needed to help him out of trouble or to allow him to gain a new start in life.

MALLORY, WHEELER & Co. of New Haven, Conn., are running their factory three days a week.

Local Checks.

THE QUESTION as to whether accounts should be settled by local checks or drafts continues to attract a good deal of attention among our readers, and we have before us letters from merchants as widely separated as New Hampshire and California, who write upon the subject as it has been presented by our correspondents in recent issues. The letters which we give below present the views of the writers in an interesting and forcible manner, and while there is not agreement in the conclusions reached, the correspondence is deserving the attention of the trade.

One correspondent, writing from the Pacific Coast under the *nom de plume* of "Links," presents the matter in the following communication :

May I ask the privilege of dipping my quill in defense of the positions taken respectively by "Banker" and "Retailer." In *The Iron Age* of June 22, p. 1399, your correspondent—whom I will call "Virginia"—attempts good-naturedly "to pour oil on the troubled waters" by brushing aside with charming unconcern the vital points aimed at. He does not seem to reason from the standpoint of right or wrong, but—so far as concerns himself—only from that of convenience. He deprecates any attempt at reform, if, indeed, this term is recognized by him, and while charging egotism he advocates it himself in the most forcible manner.

I presume "Western Banker" to be far better qualified than myself to take up his part of the case; but since I have undertaken a general reply, I will, for the occasion, take him under my wing.

Virginia says: "Each man does his own business in a way best suited to himself, regardless of what others may justly or unjustly regard as their rights." This is only measurably so. Every one transacting business knows (or will learn sooner or later) that certain accepted rules govern not only all business dealings, but most of the serious affairs of life. Those rules which are not defined legally are numbered among the "unwritten" and are well understood by the trade. While these may be frequently ignored or violated, it can never become the part of a business man openly to subvert them to suit mere personal convenience. To pay bills due at distant points in personal checks on country banks is utterly against all rules of business. In so far as they are not bankable, they do not constitute a payment any more than a check drawn on one's self; in many cases the latter would be just as good. Unless such checks fall into the hands of a corresponding bank and by prearrangement are honored, they must first find their way back to the starting point and there the local bank must issue a draft to cover just what should have been done in the first place. The plea is made that it is more convenient to write out several checks than to write out one check with a list of drafts wanted from the local bank and that it saves "worrying the bank clerks." Why! that is what they are there for, and, besides, as "Virginia" claims, they have an easy enough time as it is. Now I incline to the belief that it is rather selfish to place one's convenience at the head in such matters; that kind of practice followed up consistently may lead to unpleasant results, and should not, therefore, be recommended. But there is a suspicion in my mind that

convenience has less to do with the case than the saving of a few cents for exchange or postal fees, at the expense of the "other fellow," and that the "every man's a barber" maxim lurks behind the subterfuge. Shame! Your correspondent seems to maintain that payment by personal checks is a very general custom. I have not found it so; certainly not out here in the "wild and woolly West." Most wholesalers plainly state that they refuse to accept country checks, unless collection charges are refunded. Some so-called business men, no doubt, draw checks without any thought or knowledge as to how bank settlements are effected. Those located remote from banks often learn more of this. They act as quasi bankers themselves, by cashing city drafts or checks, and using them as remittances. In such case arrangements are made with some house to pay out the amounts due for small bills, or an account is opened with a city bank. Now, to bring home the case to "Virginia" by illustration, we will assume that a traveler has landed in his city and enters his store desirous of purchasing some needed article, costing say, \$1.50. He is perfectly responsible and his credentials are all right, but he is short of cash and offers a check in payment on a bank in his town 75 miles distant. Will "Virginia" upon finding that the cost of collection is 10 cents or more, cheerfully accept it? Wouldn't he rather try to avoid the "bother of it," anyhow?

Speaking for myself as one of several correspondents under the head of "Retailer," I will not attempt to deny that "selfishness rules the world," but I will ask: Would not worse things rule this world if supine indifference took the place of ceaseless struggle? Struggle for the better; for the right by the right. To "Virginia" it would appear as a useless thing to be butting one's head against the apparently impossible; to me it seems a desirable means by discussion and exposure to bring to the surface elements that are recognized as stumbling blocks in the pathway of legitimate trade expansion. According to "Virginia" we should stand still and leave "bad enough" alone. But we cannot if we would, the world's history has taught us this. A constant evolution is in progress, nothing has come "to stay." The business man, no less than others, has his part to play. Opposing interests are ever at war, but they may be tempered by wisdom or subdued by changing conditions. In the struggle for supremacy the fittest must survive, but let not those worthy of being the fittest lack in making the struggle. Can "Virginia" (presuming him to be a business man) ignore all influences at work in his town or city? Is there such a thing as policy? Does he realize the potency of concerted action. Is it not commendable to set influences at work by concerted action tending to the accomplishment of results sound in principle and just in practice. Are not discussion and exchange of ideas among the leading factors in enlarging views, detecting error and correcting abuses?

The Hibernian injunction with which "Virginia" closes his remarks is quite in place; it reminds me of another which, although slightly misquoted, was well meant. "Niver, me son, do tomorrow what ye moite have dun yisterday."

LINKS.

A somewhat different view is given in the following letter from a well-known Hardware house in Pennsylvania:

The local check agitation in the late numbers of your paper have been read by us with unusual interest, as for the past 20 years we have faithfully stuck to the old-time method of paying out-

of-town bills by drafts, with much inconvenience to our bank and ourselves. Two months ago we found that we were about the only firm in this city who were making payments in this manner and are glad to say that we have made the change and now and forever after will pay by check. Of course, we don't abuse this method by making checks for a few cents, as we pay all bills under \$5.00 by postal note. We have experienced no trouble by paying in this manner and think the manufacturers and jobbers who have been airing their views in your columns are kicking up an unnecessary dust. We would like to have a photo of the "long-suffering jobber" referred to in your last number. We don't get away from home very often, and would be tickled to death to see a specimen of a real live, long-suffering jobber, as most of the jobbers we have seen are prosperous, jolly fellows, growing fat by effectually drumming our trade. Now, speaking of drumming brings up another point. Don't you think that the manufacturers and jobbers are rather "penny wise and pound foolish" in objecting to paying exchange or local checks when they could economize in many other ways. For instance, the amount expended by their traveling salesmen for fine cigars and liquors, both for themselves and for "jolly" customers, amounts to far more than exchange on checks. The entertainment of customers while in the city is also quite an item. But the jobber always has his remedy. Let him add 15 to 25 cents on his casing and cartage in the local check fellow's bill, for casing and cartage, like the poor, is "always with us," and we retailers grin and bear it with as much fortitude as any L. S. Jobber ever could. In conclusion will say that the jobbers ought to be glad to get their money in any shape. Let them come out here and we'll break them in in collecting. One week of it will convince them that it is a good deal easier to sit in their offices and kick because remittances are not made to their liking than to collect in a country town.

A somewhat similar position is taken in the following letter from prominent Hardware merchants in New Hampshire:

Having read with much interest the articles about local checks in your paper, we have concluded to give you our views. In the West, in small places, it may be a disadvantage for manufacturers and others to receive local checks from the East, but we very much doubt if this is the case in New England or New York. We often have requests for our check from parties we buy of, both manufacturers and dealers—they never say draft. We were slow to send our checks until requested as a favor by the bank we do business with rather than get drafts of them, though we were paying them exchange on the latter. Of course they make charge for paying checks. They are just as willing to take out-of-town checks of us as currency. It seems to us there is a great deal more sentiment than facts in this sending drafts for honesty's sake. It is the established custom whenever any one sells goods or solicits trade to send him a check in payment. If he doesn't want the check, then is the time for him to say so. We never had any one say so at that time, and don't believe any one ever did or will. The very convenience of it will always make it the way to pay bills, if nothing else. We do not think it is what parties save that causes them to be used so much as the convenience of them. The custom has come to stay, in our opinion. Your Virginian correspondent expresses our view of it in good style and to the point.

World's Fair Exhibits.

NICHOLSON FILE COMPANY of Providence, R. I., have one of the most elaborate and attractive exhibits to be seen in the Manufactures Building. Neither pains nor expense was spared in its preparation. Their goods are shown in horizontal showcases along two sides of the space, in a large upright showcase in the rear, and on a revolving drum and revolving turret under glass in the center of the front. The flat showcases on the sides contain an assortment of over 800 varieties of large and small Files, also a variety of the company's tools and specialties. The upright showcases contain specimens of the regular Nicholson Files, consisting of 1307 Files and Blanks, together with 142 sections of Steel. The revolving drum, run by an electric motor, is 6 feet long and 4 feet in diameter, covered on the side and one end with red billiard cloth, and has attached to it in symmetrical array 1492 Files of the finest grade, XF brand. The revolving turret, which stands on one end of the drum, shows an assortment of 165 fine XF Files 5 inches long and under. The total exhibit comprises over 3000 distinct varieties of Files. The peculiarities of the fine File trade are well shown by the specimens arranged on the drum, which comprise round and square handled Needle Files for jewelers' and watch makers' use, squares, hands, knife shapes, equalings, half rounds, three squares, pillars narrow and pillars extra narrow, barrets, cants, waddings, crotchets, blunts in round, straight and three square, slittings, square and round edge joints, thick and thin, rounds and squares cut on all sides, or on one side, two sides or three sides, burnishers, &c. Numerous odd shapes are shown which were once specially made for certain customers but are now carried in stock on account of the growing demand for Files to do one piece of work only. Jewelers' surface Files are shown in one of the cases, which resemble in appearance a mounted whetstone. They consist of an oblong steel plate with a fine cut top, resting on rubber tubes, and are used to secure a perfectly flat surface. There are stub or short Files with detachable holders for shaping in and finishing around depressions where ordinary long Files cannot be used. Many varieties are shown of bent rifflers, handled, for pattern makers' and stair builders' use and for carvers in wood, metals and stone. Another specialty is a line of open-cut Files for soft metals, which do not clog up easily and are suitable for plumbers' and brass workers' use. Among curious and unusual tools are small round, straight Files, running from No. 65 Brown & Sharpe gauge to No. 40, for jewelers and watch makers, which are so small that it would seem an impossibility to cut them for Files. Die-sinkers' Files are shown in sets of 12 shapes, covering everything needed for regular or irregular surfacing. There are also flat Files composed of a mere ribbon of steel, curiously-shaped dental Files, a variety of manicure Files and other fine Files requiring the most skillful workmanship to fashion. The regular Nicholson Files shown cover all kinds of machinists' and mill Files, Rasps, &c. Among these is a rectangular File for filing hot metal in rolling mills, which has very large teeth so that the temper will be less easily drawn. The largest File shown is 24-inch, but the company have made special Files for shipyards weighing 32 pounds each, 3 feet long and double ended for two workmen. Among the tools shown are butchers' Steels, File Brushes and Cards for cleaning Files, machinists' Scrapers, and File Holders for springing Files and giving convexity

to their working faces. Disk Files are shown for use in lathes. A view of the Providence plant of the company occupies the center of one side of the upright showcase and the Pawtucket plant the other side, the Files being symmetrically arranged around them. Above this case is carved the trademark of the company, while surrounding the whole is a reproduction of Hope, the emblem of the Commonwealth of Rhode Island.

THE OMNIFORM MFG. COMPANY of New Brunswick, N. J., make a small but interesting exhibit of the Holdfast Detachable Horseshoe Calk in the Manufactures Building. A glass case contains a small figure of a horse, mounted on a stand, with all his feet exposed. Each foot is shod with nickel-plated shoes having these Calks attached to toes and heels. Full-sized shoes are shown with Calks. The Calks are either sharp or blunt and are fastened by a wedge in holes drilled in the shoes. The wedge can easily be drawn when it is desired to remove the Calk for any purpose.

WAGNER MFG. COMPANY of Sidney, Ohio, have an excellent exhibit of their cast Hollow Ware in the Manufactures Building. The specimens are arranged attached to a high velvet-covered frame extending around two sides of the space, and at the base is a platform with several steps, covered with goods also. The exhibits consist exclusively of cast-iron Hollow Ware, comprising Skillets, Baking Plates, Tea Kettles, Pots, Dutch Ovens, &c. These are shown both polished and nickel plated. The nickel-plated goods are nickeled both inside and outside. Among the goods the company show are the Wagner Waffle Iron and the Model Skillet. The Waffle Iron is made with a ball and socket joint, the irons terminating in a half sphere, with no pin or other fastening. This enables the Irons to be easily turned or lifted out for cleaning and removing the waffles. The handles are of wood, screwed on so that they cannot split and so attached that they will not burn. This Waffle Iron is adapted for use on coal, gasoline or gas stoves. The Model Skillet is only 4½ inches in diameter, but made in every respect like the large skillets. It is intended for the use of cooks in melting small quantities of butter or for other culinary purposes in which a larger utensil would be more or less wasteful or inconvenient.

WICKES REFRIGERATOR COMPANY of Chicago and New York exhibit specimens of special Refrigerator work of a high order. One is a tile-lined Refrigerator room, large enough for a man to enter to handle the contents. It is entirely lined with white tiles, has double glass windows in the door and the sides, and is furnished with capacious shelves of galvanized iron. The ice chamber occupies one-third of the structure and is arranged to secure a thorough circulation of the air currents. An incandescent electric light illuminates the interior at night. Other Refrigerators shown are for the use of merchants desiring to exhibit perishable articles under glass, having double glass fronts with shelves back of them, while the ice chambers are in the rear. A grocer's large Refrigerator is fitted with glass shelves, wire-cloth shelves and wooden racks for special articles, drawers with wire-cloth bottoms and a large compartment the full size of the Refrigerator for hanging large pieces of meat. A family Ice Chest is made with an ice chamber in the center and provision chambers on both sides. A galvanized-iron box holds the ice in the ice chamber. This box can be drawn out horizontally on a jointed frame, having feet to rest on the floor, which are snugly folded up

when not in use. This Refrigerator can consequently be made with a table top and used for other purposes, as all the openings are below in front.

E. & T. FAIRBANKS & Co. of St. Johnsbury, Vt., make a display of Scales so extensive that it is an exposition in itself. Their exhibit comprises all kinds of Weighing Machines, from large railroad track Scales to small assayers' Balances. Their line of portable Scales for warehouses, rolling mills, stores, &c., is very extensive. Some of the small portable Scales are beautifully finished with nickel-plated beams, mirrored columns and brass-covered platforms. This large exhibit is located in the Manufactures Building.

CHICAGO SPRING BALANCE COMPANY of 234 South Clark street, Chicago, make a good exhibit of Spring Balances, comprising all sizes to be held by hand, as well as counter Scales with indexes on circular faces. Their postal Scales of the latter type are for the accurate weighing of very small parcels, and are neat in appearance as well as convenient for office use. The company also manufacture a line of Bicycle Wrenches.

HENRY TROEMNER of Philadelphia has two exhibits, both of which are located in the Manufactures Building. One of these is devoted to grocers' Mills, Canisters and Scales, and is fitted up with a great variety of such articles for grocers' outfits, elegantly finished. The other display comprises analytical Balances and druggists' Scales. The analytical Balances are all under glass and very handsomely mounted. The druggists' Scales are shown in a variety of finishes. The Troemner Scales have won a high reputation for their accuracy in recording very delicate weights.

NORTHWESTERN HORSE NAIL MFG. COMPANY of Chicago have erected a pavilion in the Manufactures Building and decorated it in very ingenious fashion with Horse Nails. Festoons of silver-plated Nails are hung round the pavilion, other Nails are connected in the shape of Horseshoes, and one side of the pavilion is graced with a frame in which are shown under glass a great variety of Nails arranged in designs, together with specimens of Nails, cold hammered in all shapes, to show the toughness of the metal. On the sides of the frame are arranged Horseshoes made of Nails joined together. Surrounding the frame are Horse-Nail rods, which have been twisted cold their entire length. The preparation of this exhibit required a great deal of patient work. In making the festoons of Nails holes were drilled in the heads so that they could be strung on wires. For the Horseshoe shapes holes were drilled in the shanks so that the Nails could be fastened to a metal plate of Horseshoe shape. Boxes of Nails are displayed in the pavilion to show how the Nails are put up for the trade. All these boxes are round cornered, which is a method of packing followed by the Northwestern Company for the past three years. The company manufacture hot-forged and cold-cut Nails in 32 different sizes, making a specialty of the hot-forged.

D. R. SPERRY & Co. of Batavia, Ill., make a striking exhibit of their cast-iron wares in the Manufactures Building. They have erected a pavilion with columns composed of Drug Mortars, placed with tops and bottoms alternating; these columns are joined by a cast-iron frame work at the top, which supports a roof consisting of Farm Kettles, above which is a spire of Sugar Kettles, terminating in a finial of two Caldrons, the top one being inverted over the lower one, making a

sphere. The top Caldron is gilded, while the lower one is embellished with representations of the firm's trademark. Kitchen utensils, such as Pots, Skillets, &c., are arranged under the pavilion. There are also steam jacket Kettles, the Rival Farm Boiler, Felloe Oilers and other articles made by the firm for use by farmers, dairymen, &c. The whole arrangement of this exhibit is highly ingenious and very creditable to the designer.

SMITH & ANTHONY STOVE COMPANY of Boston make a special exhibit of Whiteley's pattern seamless jacket Kettles, manufactured for the use of hotels, restaurants, public institutions, curriers, tanners, soap makers and others requiring steam jacket Kettles. The samples shown range from small ones holding 20 gallons to a huge Kettle with a holding capacity of 125 gallons. The company also make a half-jacket Kettle, which is lower priced and is equally strong but does not boil so quickly as the full jacket.

PARKER BROS. of Meriden, Conn., make a very fine exhibit of Parker double-barrel breech-loading top-action Shot Guns in the Manufactures Building. They display 100 samples in a large mahogany showcase, comprising hammerless Guns and others with hammers, in various weights, lengths of barrel, shapes of stock, and styles of finish, straight or pistol grips, &c. They claim to have entirely overcome, by their improved check hook and pin the objection to breech-loading Guns arising from their getting loose by constant opening of the barrels, which fall with their weight upon the hinge joint. The check hook and pin sustain the weight of the barrels. The locking bolt also holds the barrels positively firm. The company state that they were the first to use low hammers, which admit of rapid sighting along the top rib of the Gun. The Parker Guns are manufactured on the American system of interchangeable parts, made by special machinery with absolute accuracy, so that any broken part can be readily duplicated.

LEFEVER ARMS COMPANY of Syracuse, N. Y., exhibit several cases filled with a very choice selection of samples of their automatic hammerless double-barreled Shot Guns, with and without automatic ejectors, bored for nitro and black powder. These Guns are beautifully finished, with stocks in choice woods, etched or polished barrels, engraved lock plates, &c. The exhibit is enhanced in interest by the addition of a number of old or curious pieces. An old flint-lock is shown, which was built by Twigg & Bass of London in 1783 for Henry Laurens of South Carolina, commissioner of the treaty of peace between the United States and Great Britain. Another flint-lock is a relic of the war of 1812. A high grade double-barreled shot gun of a century ago is an interesting antique and is in a fair state of preservation, lacking only the flint holder.

TRANSLUCENT FABRIC COMPANY of Clinton, Mass., a branch of the Clinton Wire Cloth Company, have erected a beautiful booth in the Manufactures Building to illustrate the capabilities for decorative purposes of the Translucent Fabric invented by Benjamin Scaries. This fabric has for its basis a fine steel wire cloth of the same mesh as window screen cloth, cut in lengths of 6 x 3 feet and covered with a chemically prepared solution, varying in thickness from $\frac{1}{16}$ to $\frac{1}{8}$ inch, the wire cloth being imbedded in the center. The color varies from a pale yellow to a golden amber. White will also be shortly made. While it is pliable as leather, it is stated to be capable of resisting without fracture 100 pounds pressure to the square inch, is not af-

ected by heat or cold, and is also frost, hail and rain proof. When soiled it is easily cleaned. In the construction of the pavilion the plain fabric is shown in some panels while others are filled with portraits of prominent personages painted on the fabric in oil. Mr. Scaries, the inventor, is engineer for the Clinton Wire Cloth Company and has brought out a large number of valuable patents in connection with the manufacture of Wire Cloth, Poultry Netting, &c., which have been put in practical use by that company. In his invention of the Translucent Fabric he has evidently struck a good field for the play of his genius.

THE CLINTON WIRE CLOTH COMPANY of Clinton, Mass., make a notable exhibit of their products. Two sides of the space are inclosed by an ornamental brass railing, above which is the name of the company on a Wire sign. The other two sides are filled in with panels consisting of small frames covered with samples of the company's products, such as Wire Cloth, Poultry Netting, Perforated Metal, &c. All sizes of Mesh and a variety of Metals are used in the construction of these panels, which in themselves illustrate the comprehensive character of the line of goods made. The two entrances to the inclosure are flanked by great rolls of Wire Cloth, 72 inches wide, which stand up like huge pillars. Inside the floor space is well covered with rolls of "Silver Finish" Wire Cloth and Poultry Netting, in all widths, all sizes of mesh, different gauges of Wire, as also in various metals and different colors. Some are arranged on the floor and others on platforms to give variety to the exhibit. The Perforated Sheet Metal, also shown, is a conspicuous feature of the display, illustrating the capabilities of the company in this direction. Mounted in a fine oak frame, pivoted on a stand, is a specimen of plastering done on the Clinton Metal Furred Wire Lath. The mortar is so well keyed that the claim of the company appears substantiated that ceilings plastered on this Lath will never crack. The Wire Lath is made in a number of styles, comprising the Clinton double twist warp, Clinton stiffened, Clinton corrugated and Steven's rigid, plain, japanned or galvanized. It has been used in the construction of large buildings in all the leading cities of the country where fire proof partitions were desired. The exhibit is made in the Building of Manufactures and Liberal Arts.

E. T. BURROWES & Co. of Portland, Maine, manufacturers of Screen Doors and Wire Window Screens, make an exceedingly fine exhibit, which is housed in an oak pavilion of handsome design, elaborately carved. The exhibit is located in the Manufactures Building and consists of a large number of Screen Doors and Window Screens. The Doors are hung on a large oak column, completely encircling it. Quite a number are made of rare and expensive woods, while the Wire Cloth used comprises many varieties, selected to harmonize with the character of the frames. The firm make a special Screen Door Lock which has excellent features. It can be set so that the outside knob cannot be turned, while the inside latch will work independently. Specimens of Window Screens in fine woods are shown in an oak frame with a number of slides. These Screens are grooved to work on slides, being held in place by a flat spring, strong enough to keep the Screen at any point of rest, but yielding easily to pressure, when the Screen can be instantly lifted out.

THE HOLMES & EDWARDS SILVER COMPANY of Bridgeport, Conn., occupy space in Section N, near the central

aisle, in the Manufactures Building. Here they have erected an octagonal showcase, accessible on all sides, built in pagoda form, terminating in an open cupola. The goods are arranged in this case on an inclined frame, consisting of plain sides and shelves alternating. The plain sides are covered with pale green silk, on which are fastened specimens of Spoons, Crumb Trays, Butter Knives, Cake and Fruit Knives in a great variety of patterns and finish. On the shelves are cases containing in some single pieces and in others sets of Spoons, Table Knives, Forks, &c. Around the base of this structure are grouped numerous specimens of Spoons, Knives, &c., in costly cases. The samples shown are exquisitely finished in artistic patterns. The ceiling of the interior of this case is covered with mirrors. An interesting feature of the display is a representation of the process employed exclusively by this company in improving the wearing quality of Plated Ware. They inlay the back of the Spoon bowl and the back of the handle with solid silver, a cavity being milled out for that purpose after the nickel-silver blank is formed. The silver is fused in and thus becomes an integral part of the metal. The same process is followed in the manufacture of Forks. The tips are then dipped in successive coatings of silver, after which the articles are triple plated and are warranted for 25 years.

MANHATTAN SILVER PLATE COMPANY of Lyons, N. Y., are exhibiting in the Manufactures Building. They have a showcase accessible on all sides, oblong in form. The sides are inclosed with very large single sheets of plate glass. In it they have a fine display of Plated Ware, which is an excellent representation of the perfection attained in this country in this line. Beautiful Vases, fine Tea Sets, Chocolate Sets, Table Ware of all kinds and fancy articles are shown in great variety. A magnificent Punch Bowl with a dozen Cups and a large Tray is perhaps the *chef d'œuvre* of the exhibit. The bowl is 18 inches in height, 16 inches in diameter, and the Tray is 24 inches in diameter. All are beautifully chased, and the Bowl and Cups are gold lined. They are so highly burnished that many people are of the impression that they are made of glass. Paintings on porcelain framed in silver are also shown.

BOSTON & LOCKPORT BLOCK COMPANY of Boston, and Lockport, N. Y., make a fine exhibit in the gallery of Transportation Building, E-28. They have erected two large platforms, on which are shown piles of Sheaves of all patterns and sizes. There are samples of Sheaves with roller bearings for the diminution of friction, hollow Steel Blocks, with round edges, which prevent wear of the rope, Gins which run without oiling, combination bail and hook Snatch Blocks for railroad use, Aluminum Blocks for yacht use, which are claimed to be the lightest and strongest made, vessels' wheel Blocks and dock Blocks, with ball and socket joint, which swivel and lead fair in any direction. In the center of each platform is a post, with arms supporting a variety of small Blocks of different patterns. In the rear of the platforms are racks, with large and small Blocks attached, covering a great variety. On the floor, in front, are very large Blocks, some with wooden frames, others all metal, and fitted with from one to three Sheaves. Hanging from a convenient roof brace are a number of Batt's patent Chain Hoists, which control the load at any point, cannot run down of themselves and lower and raise loads very rapidly. In connection with these are shown the

anchor trip hoop Block for steamship use, and the Boston pattern self-locking Snatch Block, which is very easily adjusted. The company also exhibit specimens of the Trucks which they manufacture for railroad, hotel and warehouse use, built very substantially to endure the roughest treatment.

NEW HAVEN CAR REGISTER COMPANY of New Haven, Conn., make their principal exhibit in the Manufactures Building, P-92. Here they have erected an ornamental frame of carved wood to which are attached six samples of their New Haven Fare Registers, three being on each side. These Registers are in use on many of the largest street railways in the country for the purpose of registering fares. There is a double registration—one set of figures running up to 999 to record the number of passengers on a trip and the other running up to 99,999 to record the passengers carried in a day, a week or a month, as the case may be. The Registers operate simultaneously on the pulling of a cord. Several styles of Registers are shown, handsomely finished. They are compact, taking up but little room and are locked so that they cannot be tampered with by any unauthorized person. Registers are also shown in place for use in electric vestibule street cars built by the Lamokin Car Works of Chester, Pa., in Transportation Building, Section L, north, spaces 9 to 11; also in horse cars built by J. M. Jones' Sons of West Troy, N. Y., same location, spaces 14 and 15; also in electric cars built by Brownell Car Company of St. Louis, in Electrical Building, Section H, space 1.

STANLEY RULE & LEVEL COMPANY of New Britain, Conn., whose warehouses are at 29 Chambers street, New York, have an exhibit located at P-92, Manufactures Building. They have installed a very fine walnut upright showcase, which contains a most elaborate display of Carpenters' Tools, attached to a background of crimson cloth. The tools shown comprise a great variety of Try Squares, some having metal-bound wooden handles, others full metal handles, plain blades, graduated blades, adjustable blades, beveling squares, &c.; Bailey's patent adjustable Planes, in all sizes and patterns, comprising iron Planes, wood Planes, adjustable Block Planes, Stanley's lateral adjustment Planes, adjustable Scraper Planes, circular Planes, Stanley's iron Block Planes, Rabbet Planes, adjustable Beading, Rabbet and Slitting Planes, &c.; Stanley's patent duplex Levels, in all sizes and different styles of finish; Screw Drivers, from mammoth sizes to very small ones; a remarkable assortment of Rules, covering an almost infinite variety, for the use of all kinds of mechanics; Butt and Rabbet Gauges, small Hammers, Scratch Awns, Hand-Saw Handles, Mallets, Spokeshaves, Stanley's "Odd Jobs," or ten tools in one, &c. The assortment of tools shown in this case, which is but 16 feet long and 4 feet wide, is of such an interesting and comprehensive character that it is an unfailling attraction to mechanics, who are thus constantly being instructed with regard to the special tools manufactured by the company.

THE SUMMIT REFRIGERATOR MFG. COMPANY of Michigan City, Ind., make an exhibit of their Refrigerators in Manufactures Building, section O, block 2. The conspicuous feature of this exhibit is a solid mahogany side-board Refrigerator which is stated to have cost \$1000. It is of large size and most elaborately carved. The central panel in the top, which is usually filled with a mirror, is in this case ornamented with a fine carving which depicts the landing of Columbus. On a bracket to the left stands a carved stat-

nette of George Washington, while on the right is the Goddess of Liberty. This Refrigerator is substantially built for regular service, is fitted with the company's patent double system of air circulation, large ice chamber, cold water tank &c. Other Refrigerators shown are regular goods, embracing a number of domestic styles, finished in hard wood, antique finish, with solid bronze trimmings, and built on the double system of air circulation, for which special claims are made.

Prize Competitions.

Prize Competition No. 27 (Reopened).

Local Associations of Merchants.

This competition closed July 8, but in view of the exceptionally few replies which have been received from the trade and the importance and practical nature of the subject, we reannounced it as above, and extend the time up to which responses will be accepted to September 16.

The formation of local associations has been found feasible in many places for the purpose of securing more friendly relations among competitors and reaching an understanding in regard to matters of common interest. Among the good results referred to as coming from such associations are the following: Overcoming petty jealousies; cultivating a spirit of fraternity; listing of undesirable customers; an understanding in regard to time of presenting bills; putting in operation early-closing movements; agreement as to the prices at which goods are to be sold; mutual accommodation in supplying goods which one merchant may be temporarily short of, &c. The subject is thus evidently a broad one and of a good deal of practical interest. In discussing it the following points are suggested:

Whether it is desirable to have such associations;

How such associations may be organized;

The objects to be accomplished by them.

It will also be of interest to have any information in regard to the practical working of such associations.

This competition will remain open until September 16, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize.....	\$12.50
Second prize.....	7.50
Third prize.....	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest.

The committee to whom the papers in Competition No. 23 were referred have awarded the prizes as follows:

First prize to J. E. JANSSEN.
Second prize to C. O. F. YOUNGSTROM.
Third prize to E. H. MASON.

Price-Lists, Circulars, &c.

THE CHAPMAN MFG. COMPANY, Meriden, Conn.: Sleigh Bells for 1893-94. Miniature catalogues and illustrated price lists are bound in three styles, all being identical in paging, showing the manufacturers' full

line of these goods. Many new styles are shown for the coming season, among which are extra quality body strap Bells. These include coverings of Alaska sealskin, beaver, mink and kangaroo skins; green snake, alligator, black or russet leather, &c. The company have an exhibit at the World's Fair, Section P, Manufactures Building. Mortimer McRoberts Company, 230 Lake street, Chicago, are their selling agents.

E. T. FRAM, Keystone Lock Works, Lancaster, Pa.: 1894 catalogue of Malleable Iron, Steel, Bronze and Brass Padlocks. This is a cloth-bound book of convenient size, containing 100 pages. Illustrations and descriptions, with list prices, are given of upward of 131 different Padlocks. Of these 75 are new patterns brought out since the issue of the preceding catalogue. The new patterns cover Malleable Iron spring self locking Padlocks; rustless steel Padlocks, with all-brass inside works and revolving cylinder key guides; cast bronze metal Padlocks, self-locking, with spring shackles; cast solid bronze metal self-locking Padlocks, extra heavy; cast bronze metal key-locking Padlocks, with secured shackles; cast bronze spring self locking Padlocks, extra heavy. Little Giant bicycle Padlocks: bicycle Padlocks, extra heavy, with dust-proof plungers, closing shackle openings, and revolving cylinder key guides; baggage Padlocks and Padlocks for railroad switches and cars and prisons. Nearly all the Locks are stated to contain the latest improved dust-proof plungers. These plungers are a valuable feature in railroad car and switch Locks, as obviating the liability to derangement of the mechanism on account of the entrance of ashes, cinders and dirt. The Locks are shown in a variety of styles, and the illustrations represent the exact sizes. In an introductory address attention is directed to the facilities for the production of special goods.

FULTON WIRE WORKS, Wooley & Co., proprietors, 61 Fulton street, New York: Wire, Iron and Brass Work. Their special catalogue C shows designs of metal work which can be wrought in brass, steel or iron, and can be given any finish desired, making the work in keeping with wood and stone used for interior and exterior finish. The catalogue illustrates Wickets, Counter Railing, Elevator Fronts, Wire Fence, Grills, Vault Doors, Sign Plates, &c. A specialty is made of original designs, not to be duplicated, for Bank Counter Rails, Elevator Inclosures, Elevator Cabs and Grills.

W. M. MOONEY & Co., Au Sable Chasm, N. Y. and Chicago: C B K Horse Nails. In a circular devoted to these goods the manufacturers state that the Nails are soft and uniform, hardened at the extreme point for driving, similar to those made by hand. The Nails are made in sizes from 1½ to 2⅞ inches.

HARTMAN MFG. COMPANY, Beaver Falls, Pa.: Hartman Specialties. A pamphlet illustrates Steel Picket Fence, Wire Panel Fence, Steel Window Guard, Steel Tree and Flower Guard, Flexible Wire Mat, &c.

BLISH, MIZE & SILLIMAN HARDWARE COMPANY, Atchison, Kan.: Price current of fall goods. The catalogue contains 66 pages, illustrating with prices

and descriptions, Stove Boards, Fire Shovels, Hods, Stove Pipe, Hollow Ware, Scoops, Fire Sets, Lamps, Lanterns, Skates, Axes, Saws, Measures, Meat Cutters, Wringers, Ammunition, Clocks, Flat Silver-Plated Ware, Scales, &c. Quotations are given in letters, with a key attached to the first page.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo.: A folder relating to season goods for fall and winter. The design of the circular is to answer the question of how to get on the inside these trying times. Axes, Saws, Stove Pipe material, Elbows, Coal Hods, Dampers, Stove Boards, Fire Shovels, Zinc Scoops, Huskers, Corn Knives, Meat Cutters, Lanterns, Lamps, Skates, &c., are goods to which attention is called.

THE FERRIS HAME COMPANY, Linwood, Ohio: Revised price-list of Wood Hames. The line includes rock elm Hames; Mine, Gig and Plow Hook Hames; Cart Trees, New Orleans Ball Top and High Top Hames; Half Strapped, Lace Hook, Globe Ball Top Clip, Bent Ball and Dandy Ball Top Hames; Hame Trimmings, &c.

BARROWS LOCK COMPANY, Lockport, Ill.: Supplements No. 4 and 5. No. 4 is devoted to Corner Plates, Escutcheon Plate and Pull, Cupboard Latch and Escutcheon, all in Chicago and colonial design; also Drawer Pulls, in Chicago, colonial and fluted designs. Supplement No. 5 includes bronze metal Towel Racks or Rods, in a variety of styles, cast bronze metal Stair Corners, brass or bronze metal Stair Rods and Curtain Rods; heavy cast bronze metal Trimming Nails, cast bronze metal Soap Dish, and cast bronze metal Match Safe and Ash Receiver.

HOWARTH REVERSIBLE SASH & SASH CENTER COMPANY, Detroit, Mich.: Howarth Reversible Sashes and Sash Centers. The Centers are made in different styles adapted to oval or circu ar sash, hung on the sides; Sash hung top and bottom or sides, for factories, and for Sash to be hung top and bottom. Illustrations and explanations are given showing and describing the working and advantages of these centers.

THE GENESSEE VALLEY MFG. COMPANY, Mount Morris, N. Y.: Drills, &c. Illustrations and descriptions are given in their catalogue of the Missouri Grain and Fertilizer Drill, in which the force feed is a prominent feature; self-adjusting Land Roller, Genessee Land Roller, flexible King Roller, Tailors' Irons, Sad Irons, Corn Shellers, solid steel V shaped Harrow Teeth, &c.

It Is Reported—

That Spencer & Co., Hardware dealers, Keene, N. H., have admitted William O. Hutchins as a partner in the concern, the change having taken place August 1. The company now consists of Newton Spencer, W. H. Stone, Herbert A. Woodward and William O. Hutchins. The business will be continued under the title of Spencer & Co., as heretofore.

That in a large fire at Sidell, Ill., on the 9th inst., the Hardware store of Freeman & Gray was destroyed.

That F. P. Rogers has built an addition to his Hardware store at Belmont, Mass.

That T. H. Dean's Hardware store, at Milford Center, Ohio, was destroyed by fire on the 11th inst.

That J. A. Higgins' Hardware store, at Waltham, Mass., was damaged by

fire on the 10th inst., the loss approximating \$10,000.

That Rau Bros.' Hardware store, Louisville, Ky., was badly damaged by fire on the 9th inst. The loss was \$6000, fully covered by insurance. The fire was caused by the carelessness of one of the firm's employees, who thoughtlessly dropped a match into a pile of loose straw in the cellar of the establishment.

That articles of incorporation have been filed by the Union Stove & Hardware Company, Kansas City, Mo., with a paid-up capital stock of \$10,000. The incorporators are Upton Eby, W. H. Miller, David Eggeman and John Long.

That the interest of Samuel S. Moyer in the Hardware firm of M. C. Ebbecke & Co., Allentown, Pa., has been purchased by William H. Hunsicker. Mr. Hunsicker was for many years traveling salesman for a Philadelphia house.

That the establishment of the Long & Curten Hardware Company, Grafton, W. Va., was damaged by fire on the 2d inst.

That the Hardware stock of Kubias & Martinek, Cedar Rapids, Iowa, was damaged by fire on the 2d inst. Loss, \$7000.

That Saunders & Maxson's Hardware store, at Milton, Wis., was recently burglarized, the goods stolen being valued at \$50.

That the store of the Barrett Hardware Company, Joliet, Ill., was robbed on the 4th inst.

That fire recently damaged the Hardware store of Houlehan & Quillen, Crawfordsville, Ind.

That H. W. Tonner, Hardware merchant, Steubenville, Ohio, has disposed of his business to George E. Harper. Mr. Tonner contemplates removing to St. Louis.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

There is nothing in the way of new feature to note for the week under review: The effect of the late decline in prices of Linseed Oil, domestic Oxide Zinc and some bulk Colors, used almost exclusively by grinders, no longer cuts any figure, and business in nearly all departments proceeds about as usual at this season of the year. The dullness of trade naturally keeps prices for various goods irregular and on a low level, but no radical changes have taken place since the date of last week's review.

White Lead.—Some orders have been placed for round lots of corroder's product for autumn delivery, but the business in that connection does not appear to be up to the average, although, according to some accounts, buyers of 12-ton lots could secure special guarantee of protection in the event of the combine prices being reduced. The jobbing movement has continued slow and chiefly for small packages. Quick-process and mixed Leads have fared no better, either in movement of stock or average of prices.

Red Lead.—Foreign stock, in barrels, has been sold at as low as 5½¢, ex-dock. The indications are that more could be had, ex-vessels afloat, at the same price. A weak market is thus reflected, but home producers make no direct concessions, although rumor has it that foreign competition is met

where desirable orders may be at stake.

Litharge.—From the large consumers of low-grade product there is little demand, but inquiries as to prices for autumn deliveries indicate some disposition to place orders if attractive inducements are made. High grades are taken in strictly routine manner, however, and the old list prices are adhered to.

Orange Mineral.—Moderate sales only have been made, and the demand is extremely flat. Of the business passing the greater portion is in French brands, but the very low prices for German divert some attention in that direction. Domestic is dull and unchanged.

Zincs.—A livelier movement of American Oxide in delivery on contracts and a fair amount of new business is noted, but business is slow and the late reduction in prices has stimulated business to a very moderate degree only, since the fact seems to be generally known that present cost of production is very low.

Colors, &c.—Dry Colors for grinders' use are meeting with slightly better sale, for future delivery, but the movement continues backward and prices are still rather weak nearly all along the line. Dry and Oil Colors for painters' use have moved off slowly, and the movement in ready-mixed Paints has also been on a moderate scale. Prices show no radical change, but lean in buyers' favor.

Miscellaneous.—Block Chalk has undergone no change. Whiting is, if anything, a shade weaker, but shows no positive decline. Demand is rather disappointing. Barytes and the general line of Clays are barely steady in price and meet with slow sale.

Oils and Turpentine.

No important changes have taken place during the past week. The excitement attending the recent break in Linseed Oil seems to have quieted down and no features have developed in other lines calculated to affect values a great deal or to stimulate business. Hence very tame markets and almost stationary prices.

Linseed Oil.—City crushers have made no further change in their prices, although the report has circulation that some out-of-town producers have offered carloads of raw Oil at 43¢ @ 44¢, on net cash terms. The market has an unsettled and weak appearance, however, with business even slower than usual at this season of the year.

Cotton Seed Oils.—Dealings in both crude and refined products have been on a very moderate scale. The demand has been lifeless as well, and while prices are not radically lower the market shows very broad signs of being weaker beneath the surface than above.

Lard Oil.—A routine seasonable business of fair proportions, chiefly at old prices, covers about all there is to report on the market for this article. Prices stand just about as they were a week ago for high grade stock.

Fish Oils.—Business in crude Sperm Whale and Menhaden has been moderate—not sufficient, in fact, to move values perceptibly. The manufactured Oils have also been quiet, but the moderate business effected was at practically former rates.

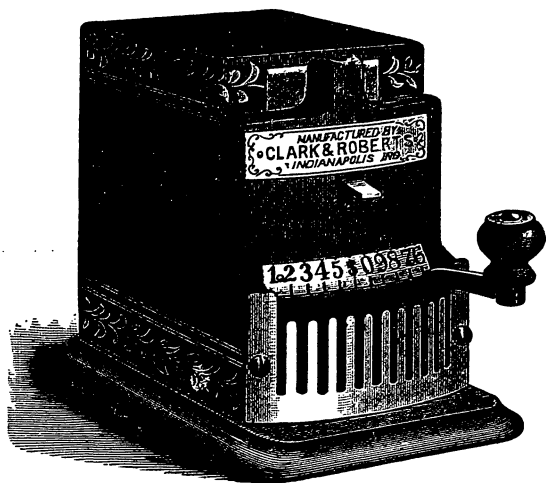
Miscellaneous.—Cocoanut Oils have met with very slow sale and prices are still rather weak. Common Olive Oil has sold a little more freely at old prices. Minor Oils without change in price and selling slowly.

Spirits Turpentine.—Prices have weakened to about 25½¢ for ordinary, and 26¢ for machine barrels. The market is rather dull at the decline, and inquiries are too light to brighten the outlook.

The Clark Check Perforator.

The accompanying illustration represents a check perforator manufactured by C. W. Crary & Son, 90-92 Illinois street, Chicago, for Clark & Roberts,

square-lift movement, and a conveniently shaped brass handle. A feature of the lantern is a wind-brake guard, represented in the cut by the band located near the top of the chimney. The band is attached to the side strips to

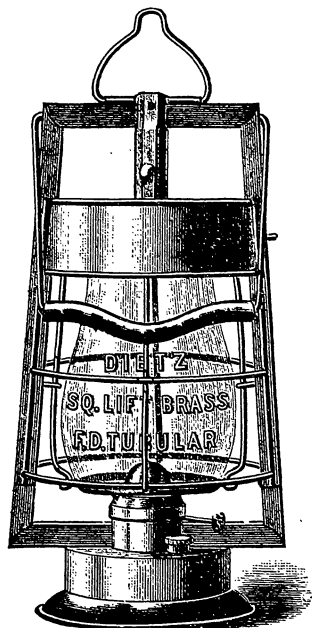


The Clark Check Perforator.

Indianapolis, Ind. The manufacturers state that the paper remains in full view during the operation of cutting; that the check is inserted and withdrawn with the greatest ease; that the perforator is operated by means of one lever; that the figures are cut clean and in alignment; that the feed rolls hold and feed the paper in any position. The mechanism is described as of the simplest and most substantial construction, closely incased, protecting it from dust. The machines are guaranteed by the manufacturers against any defects in workmanship, and may be obtained from either of the above concerns.

No. 0 Square-Lift Fire Department Lantern.

R. E. Dietz Company, 60 Laight street, New York, and 25 Lake street, Chicago, are putting the above lantern



No. 0 Square-Lift Fire Department Lantern.

on the market, as illustrated herewith. It is made of brass in a substantial manner, particularly adapted to the use of fire departments. The lantern has a

which the wire guards are fastened. These strips, with wind brake and wires attached, slide on the upright square tubes, the whole being held in place by a spring push connected with one of the square tubes. This permits the chimney to be removed for cleaning, &c. In this connection the manufacturers state that they continue making their all-tin fire department lantern; also the tin one with copper oil pot, for fire department use.

Compound Lever Cork Screws.

Francis H. Loss, Jr., 33 Murray street, New York, is introducing the Reliable

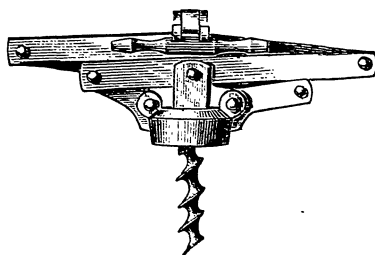


Fig. 1.—Reliable Cork Screw.

and Peerless compound lever cork screws, as shown in Figs. 1 and 2.

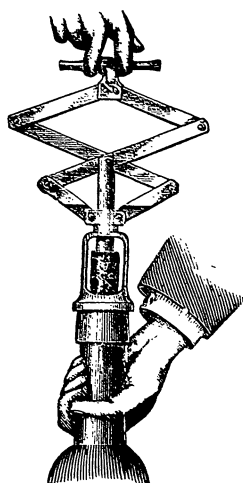


Fig. 2.—Peerless Cork Screw.

Fig. 1 illustrates the Reliable pattern and shows it in its most compact form. In this position the closed levers are

used as a handle and afford an opportunity for inserting the screw in the cork. When this is accomplished the drop handle is grasped and raised until the cork is withdrawn. The levers are made of steel. When closed the greatest width is $5\frac{1}{4}$ inches; extended, it measures $8\frac{1}{4}$ inches. Emphasis is laid on the ease with which the most stubborn cork is extracted. Fig. 2 represents the Peerless pattern in operation, the difference between the two being in the length of the socket, the longer socket having a tendency to steady the cork while it is being drawn.

Alaska Stove-Lid Lifter.

Troy Nickel Works, Troy, N. Y., are putting a new style of lifter on the market, as illustrated herewith. In con-



Alaska Stove-Lid Lifter.

struction the lifter is similar to others of their make, having a spiral wire handle, with a ring upon the end for hanging it up. The manufacturers claim for the lifter, durability, fine finish and that it is always cold.

MERIDEN BRONZE COMPANY have now on exhibition at their New York showrooms, 30 Park place, a handsome line of various kinds of Lamps, many of which have been prepared for this season's business. They are of medium and higher grades, suitable for fine trade. A good assortment of Vases has been imported for use as standards in Lamp mounting, and are now ready. The Lamps have been made up in numerous finishes and designs, those in gold and silver plate predominating, with many trimmed with onyx. A generous supply of art goods, including onyx and gold Tables, &c., can also be seen.

Lavigne's Peerless Meat Tenderer.

The Lavigne & Scott Mfg. Company, New Haven, Conn., for whom the Frasse Company, 19 Warren street, New York, are agents, are introducing the above article, as illustrated herewith. The tenderer consists of toothed blades

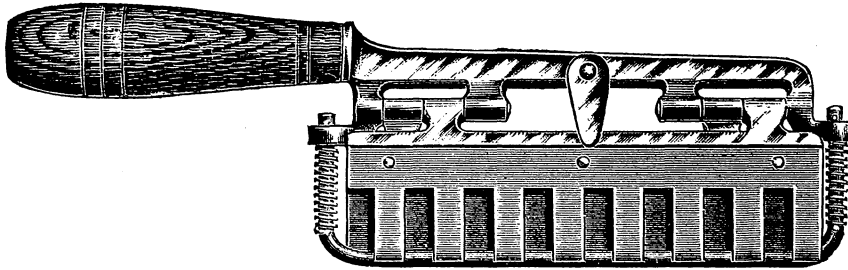


Fig. 1.—Lavigne's Peerless Meat Tenderer.

being held in place by pieces pivoted to the frame. Between the blades is a heavy wire, with springs at each end, so arranged as to allow the wire to give when a blow is struck. The teeth of one blade are opposite the opening of the other blade, this arrangement being referred to as an advantage in operation. The shank runs through the wood handle and is secured at the end by a nut. By turning the pivoted pieces the blades can be opened for cleaning, as in Fig. 2. The manufacturers claim that the tenderer is made of the best

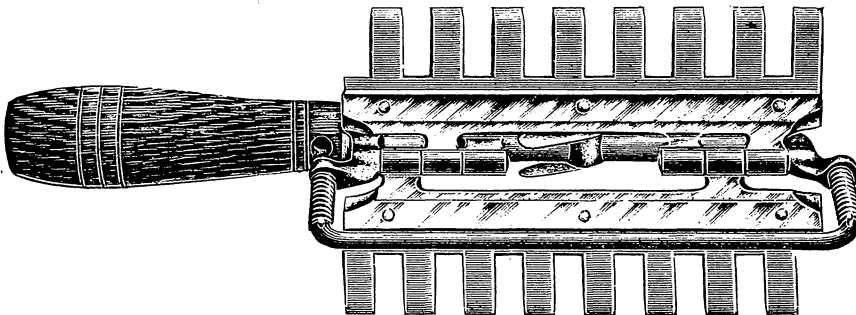


Fig. 2.—Meat Tenderer Open.

stock, in the strongest possible manner, and owing to its simplicity cannot get out of order. They are made with bright blades, bright wire and japanned frame, also full nickeled.

Last week the prospects were considered good for an early resumption of operations at the works of the New Castle Wire Nail Company, New Castle, Pa., but owing to strict adherence on the part of the workmen to the rules of the Amalgamated Association, hopes in that direction have been dispelled. A proposition was made to the men to work at a slight reduction of wages. The reduction was considered reasonable, but the present scale must remain in force three months longer, as it cannot be changed, according to the association rules, until the limit of time for which it was made has expired, and it would seem that the men prefer to remain idle in the meantime rather than accept slightly reduced wages to enable the proprietors to keep their plant in operation during times of quiet trade and depressed markets. We are advised by telegraph that the wire-drawing scale has been signed, but that the other matters are not yet settled.

NEW PUBLICATIONS.

THE COLUMBIAN EDITION of the catalogue of the S. A. Woods Machine Company of Boston, New York and Chicago has been received. This illustrates and describes wood-working machinery of every description. These machines are adapted to meet the de-

mands of the best modern mill practice and embody the latest advances and improvements, together with all desirable features which long trial has demonstrated to be most efficient and durable.

In designing these machines special care is taken that the material shall be so distributed as to withstand the strains consequent upon high speed and constant hard service. A thorough system of supervision and inspection is established in all departments, care is given to every detail, the mechanics are skill-

ful, only the best quality of materials is used; and in every instance the machines are put into practical operation and carefully tested before leaving the works.

IMPORT DUTIES OF URUGUAY AND IMPORT DUTIES OF HAITI. Published by the Bureau of the American Republics, Washington.

The Bureau of the American Republics continues its excellent work in providing manufacturers and merchants with information valuable in their business relations with Central and South American countries. The latest work of this kind has been the publication in full of the duties on imports into Uruguay in both the Spanish and English languages. The same work has been carried through for Haiti in French and English.

Early in September about 40 members of the French Société des Ingénieurs Civils will arrive in this country. They will be the guests in New York and on their way to Chicago of those members of the four national engineering societies who were in Paris in 1889. Among

the visitors will be Paul Jousset, president of the society; Edmund Beaudet and L. Dufes of the Fives Lille Company, A. Domange-Scellos of Paris, G. Hersent, V. Toussaint of Creusot, and A. A. Detranger, G. Grobot, E. H. Bourgeois and H. Marchais of the Société de la Marine et des Chemins de Fer, often known as the St. Chamond Company.

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Current Hardware Prices.

AUGUST 23, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&100@50&10&5 % signifies that the goods in question are sold at prices ranging from 50 cent 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... 7 doz \$3.00, 33¢
Excelsior..... 7 doz \$10.00, 50&10&25
Worth's..... list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Eagle Anvil, 7 lb 9¢..... 15&15&25
Peter Wright's..... 11&11&14
Armstrong's Mouse Hole..... 10¢
Am. Wrought, Horse shoe brand, 11&11&14
Trenton..... 10¢
Wilkinson's..... 10¢
Moore & Barnes Mfg. Co..... 33¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20¢
Osney Anvil and Vise..... 25¢
Allen Anvil and Vise \$3.00..... 40&10
Vise..... 45&50

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Common Augers and Bits..... 70&70&10
Boring Machine Augers..... 70&70&10
Car Bits, 12-in. twist..... 50¢
Russell Jennings' Augers and Bits..... 25&10
Jennings' Pattern Car Bits..... 40¢
Jennings' Pattern Auger Bits..... 60¢
Jennings' Bits..... 60¢
C. E. Jennings & Co., No. 10, extension
lip..... 40¢
C. E. Jennings & Co., No. 30..... 60¢
C. E. Jennings & Co., Auger Bits, 1/2 set,
3/4, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 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2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034

Chalk Lines—See Lines.**Checks, Door—**

Unity.....	50%
Chisels—	
Socket Framing and Firmer	
P. S. & W.....	
New Haven.....	
Wetherby.....	75&10@75&10&10%
Ohio Tool Co.....	
Douglas.....	75@75&5
Buck Bros.....	30%
Merrill.....	60&10@60&10&5
L. & J. White.....	30@30&5

Tanged and Miscellaneous.

Tanged Firmers.....	50@50&10%
Butchers'.....	\$4.75@55.00
Spears & Jackson's.....	\$5 to 2
Buck Bros.....	30%
Cold Chisels, # 2.....	15@10%

Chucks—

Beach Pat.....	each, \$8.00.....20%
Morse's Adjustable, each.....	\$7.00, 20@20&5
Danbury.....	each, \$6.00, 30@30&5
Syracuse, Balz Pat.....	25%
Graham Patent.....	39%
Skinner's Patent Chucks.....	
Combination Lathe Chucks.....	39%
Universal Lathe Chucks.....	40%
Independent Lathe Chucks.....	40%
Drill Chucks.....	15%
Union Mfg. Co.....	
Victor.....	\$8.50, 25%
Combination.....	40%
Universal.....	40%
Independent.....	40%

Churns—

Union, each, 5 gal.....	\$3.25; 7 gal., \$3.75; 10 gal., \$4.25
Derrald's Barrel Churn, each.....	6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25

Clamps—

E. I. Tool Co.'s Wrought Iron.....	25%
Adjustable, Cincinnati.....	15&10%
Adjustable, Hammers.....	15@15&5
Adjustable, Stearns.....	30@30&10%
Stearns' Adjustable Cabinet and Cor.....	50@50&10%
Cabinet, Sargent's.....	70&10%
Carriage Makers, Sargent's.....	75@75&5
Carriage Makers, P. S. & W. Co.....	40&10%
Eberhard Mfg. Co.....	40&5&10&10%
Warner's.....	40&10&40&10&5
Saw Clamps, See Vices, Saw Filers.....	
Carpenter's, Cincinnati.....	25&10%
Barnes' Machinists' Clamps.....	39%

Cleavers, Butchers'—

Bradley's.....	25&30%
L. & J. White.....	20&5
Beatty's.....	40@40&5
New Haven Edge Tool Co's.....	40%
P. S. & W.....	33&5@33&5&10%
Footers Bros.....	30%
Schulte, Lohoff & Co.....	40@40&5

Clips—

Norway, Axle, 1/4 & 5-16.....	55&5&5
2d grade Norway Axle, 1/4 & 5-16.....	55&5&5
Superior Axle Goods Co.....	60%
Norway Spring Bar Clips.....	5-16, 30&5&5
Wrought Iron Felloe Clips.....	# 2, 5 1/2
Steel Felloe Clips.....	# 2, 5 1/2
Baker Axle Clips.....	25%

Cloth and Netting, Wire—

—See Wire, etc.

Cockeyes—

Cocks Brass—	60&2%
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Coffee Mills—See Mills, Coffee.**Collars, Dog—**

Chapman Mfg. Company, new list.....	40%
Bedford Fanc Goods Co.....	40&10&50%
Embossed, Gift, Pope & Steven's list.....	30&1%

Combs, Curry—

Leather, Pope & Steven's list.....	40%
Brass, Pope & Steven's list.....	40%

Compasses, Dividers, &c.

Compasses, Callipers, Dividers.....	70@70&10%
Bemis & Call Co's.....	
Dividers.....	65%
Compasses.....	50&5
Callipers, Inside or Outside.....	65%
Callipers, Wing.....	65%
Callipers, Double.....	65%
Callipers, Call's Patent Inside.....	55%
Excelsior.....	50%
Stevens & Co's.....	25&10%
Starrett's.....	
Spring Callipers and Dividers.....	25&10%
Lock Callipers and Dividers.....	25%
Combination Dividers.....	25%
Coolers, Water—	
S. S. & Co.: 2-gal., \$2.00; 3-gal., \$2.50;	
4-gal., \$2.75; 6-gal., \$3.40 each.....	33%

Coopers' Tools—

—See Tools, Coopers'.

Cord—

Sash—	
Common.....	# 2, 3/4@94
Patent, good quality.....	# 2, 10@11 1/2
White Cotton Braided, fair.....	# 2, 23@24
Common Russia Sash.....	# 2, 12@13 1/2
Patent Russia Sash.....	# 2, 13@14 1/2
Cable Laid India Sash.....	# 2, 19@20 1/2
India Cable Laid Sash.....	# 2, 11 1/2@12 1/2
Silver Lake—	
A quality, White, 50#.....	25%
A quality, Drab, 55#.....	25%
B quality, White, 30#.....	10%
B quality, Drab, 35#.....	10%
Sylvan Spring, Extra Braided, Drab.....	39%
Sylvan Spring, Extra Braided, White.....	39%
Temper Idem, Braided, White.....	27@28
Egyptian, India Hemp, Braided.....	26%
Massachusetts, White.....	29%
Samson—	
Braided, White Cotton.....	# 2, 37%
Braided, Drab Cotton.....	# 2, 42%
Braided, Italian Hemp.....	# 2, 40%
Braided, Linen.....	# 2, 56%
Steel's Solid Braided—	
Hercules, White.....	# 2, 25%
Hercules, Drab.....	# 2, 30%
Economy Drab.....	# 2, 27%
Economy White.....	# 2, 22%
Ossawa Mills—	
Braided Giant, Whit # 2, 30#.....	20%
Braided Giant, Drab and Fancy, # 2.....	25%

Drilled, Crown White, # 2, 50#.....50%**Braided, Crown Drab and Fancy, # 2.....30%****Wire Picture—**

Braided or Twisted.....80&5@80&15%

Corkscrews—See Screws, Cork.**Corn Knives and Cutters—**

—See Knives, Corn.

Crackers Nut—

Table (H. & B. Mfg. Co.).....	40%
Blake's Pattern, # doz.....	\$2.00.....10%
Turner & Seymour Mfg. Co.....	50%
Acme.....	
Japanned, # gro., \$30.....	50%
Nickel Plated, # gro. \$30.....	10%

Cradles—

Grain.....50&2@50&5&2%

Crays—

White Crays, # gross.....	7@8
D. M. Stewart Mfg. Co.....	
Metal Workers', # gross, \$1.75.....	25%
Rolling Mill, # gross, 2.50.....	25%
Railroad, # gross, 2.00.....	25%
Soapstone Pencils, # gross, 1.00.....	25%

See also Chalk.

Creamery Pails—See Pails, Creamery.**Crow Bars—See Bars, Crow.****Curry Combs—**

—See Combs, Curry.

Curtain Pins—

—See Pins, Curtain.

Cutters—**Meat—**

Dixon's, # doz.....	2.....40@40&5
Nos.....	1.....2.....3.....
.....	\$14.00 \$17.00 \$19.00.....
Woodruff's, # doz.....	100.....150
Nos.....	1.....2.....3.....
.....	\$15.00 \$18.00.....

Hale's, # doz.....

Nos.....	11.....12.....13.....
.....	\$27.00 \$33.00.....
American.....	1.....2.....3.....
Each.....	\$5 \$7 \$10 \$25 \$50 \$60

Enterprise.....

Nos.....	10.....12.....22.....32.....42.....
Each.....	\$3 \$2.50 \$4 \$6 \$15

Little Giant, # doz.....

Nos.....	305.....310.....312.....320.....322.....
.....	\$35.00 \$48.00 \$44.00 \$72.00 \$88.00

Triumph No. 505, # doz.....

Miles' Challenge, # doz.....	45@45&10%
Nos.....	1.....2.....3.....
.....	\$22.00 \$30.00 \$40.00

Home No. 1, # doz.....

Draw Cut, each.....	5.....6.....8.....
Nos.....	\$50 \$75 \$80 \$225.....

Beef Shavers (Enterprise).....

Chadborn's Smoked Beef Cutter, # doz.....	\$66.00
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Saw and Kraut—

Tucker & Dorsey Mfg. Co.....	
Saw Cutters, 1 Knife, # gross.....	\$21.00
Saw Cutters, 2 Knife, # gross.....	30.00
Kraut Cutters.....	40%

Tobacco—

Champion.....	20&10@30%
All Iron.....	# doz., \$4.25
Nashua Lock Co's.....	# doz., \$18.00, 50@55&5
Wilson's.....	# doz., \$24.00, 55@10
Sargent's.....	# doz., \$20.00, 40%
Acme.....	

Washer—

Smith's Pat.....	# doz., \$12.00, 20@10&10%
Johnson's.....	# doz., \$11.00, 33&4
Penny's.....	# doz., Pol. \$14; Jap'd, \$16, 55%
Appleton's.....	# doz., \$18.00, 60&10%
Bonney's.....	30&10%
Cincinnati.....	25&10%

Diggers, Post Hole, &c.—

Samson, # doz., \$34.00.....	25@25&10%
Fletcher Post Hole Augers, # doz.....	\$36.00
Vaughan's Post Hole Auger, # doz.....	\$12.00@13.00

Kohler's Little Giant.....

Kohler's Hercules.....	# doz., \$15.00
Kohler's Invincible.....	# doz., \$12.00
Kohler's New Champion.....	# doz., \$8.00
Scheidler.....	# doz., \$18.00
Cronk's Post Bars, # doz.....	\$80.00

Gibbs' Post Hole Digger.....

Gibbs' National.....	# doz., \$15.00
Gibbs' Columbia.....	# doz., \$13.00
Gibbs' Imperial.....	# doz., \$7.50
Shimer's Hollow Handle.....	# doz., \$24.00

Gem, Improved # doz.....

\$9.00@10.00 net

Dividers—See Compasses.**Dog Collars—See Collars, Dog.****Door Checks—**

—See Checks, Door.

Door Springs—

—See Springs, Door.

Drawers.

Money, # doz.....	\$18@20
Waddell's Improved, # doz.....	\$15.00

Drawing Knives—

—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....	each \$1.75
Blacksmiths' Self-Feeding, each.....	\$7.50, 20%
Breast, P. S. & W.....	40&10%
Breast, Wilson's.....	30&5
Breast, Millers Falls.....	\$3.00, 20%
Breast, Bartholomew's.....	each \$2.50

Ratchet, Merrill's.....

Ratchet, Ingersoll's.....	25%
Ratchet, Parker's.....	20@20&5
Ratchet, Whitney's.....	20&10%
Ratchet, Weston's.....	20&25
Ratchet, Moore's Triple Action.....	25@30%
Ratchet, Curtis & Curtis.....	30%
Whitney's Hand Drill, Plain, \$11.00.....	
Adjustable, \$12.00.....	20&10%
Automatic Boring Tools.....	\$1.75@1.85
Chicopee Automatic Drill.....	20&10%
Goodell Automatic Drills.....	40&5

Twist Drills—

Cleveland.....	50&10&10%
Diamond, W. & B.....	60&10&10%
Graham's Pat. Groove Shank.....	60&10&10%
Morse.....	50&10&10%
New Process.....	50&10&10%
Standard.....	50&10&10%
Syracuse (Metal list).....	50&10%

Drill Bits or Bit Stock**Drills—See Augers and Bits.****Drill Chucks—See Chucks.****Dripping Pans—**

—See Pans, Dripping.

Drivers, Screw—

Douglas Mfg. Co.....	20@20&10%
Disston's.....	50%
Buck Bros. & L. Co's.....	30%
No. 64, Varnished Handles.....	65&10%
No. 86.....	70&10%

Sargent & Co's.....

No. 1, Forged Blade.....	60&10&10%
Nos. 20, 40 and 60.....	60&10&10%
S. & Co.....	70%
Knapp & Cowles.....	
No. 1.....	60&20@70%
No. 2.....	60&10&10@70&5
No. 3.....	60&25@60&10%
Nos. 4 and 00, Acme and Ideal.....	50&5

Stearns'.....

Gaek & Parsons.....	25&10%
Champion.....	25&10%
Clark's Pat.....	30@33&4
Ellrich's Socket and Ratchet.....	25@25&10%
Allard's Spiral, new list.....	25%
Kolb's Common Sense.....	# doz., \$6.00

Syracuse Screw Driver Bits.....

Screw Driver Bits, # doz.....	50@75&5
Screw Driver Bits, # doz.....	\$6.25
Fray's Hol. H die Sets.....	No. 3, \$12.00, 45%
Cincinnati.....	25&10%
Brace Screw Drivers.....	25&10%
Buck Bros' Screw Driver Bits.....	27&5&5

Goodell's Automatic.....

Mayhew's Black Handle.....	50%
Mayhew's Monarch.....	45&10%
C. T. Williamson Wire Novelty Co.....	50%

Egg Beaters—See Beaters, Egg**Egg Poachers—**

—See Poachers, Egg.

Electric Bell Sets—

—See Bells, Electric.

Emery—No. 4 to No. 54 to Flour, etc.

46 gr.....	150 gr.....	F.F.F.....
Kegs, # d.....	4 1/2.....	5.....
1/2 kegs, # d.....	4 1/2.....	5.....
1/4 kegs, # d.....	4 1/2.....	5.....
10-cans, 10.....	6.....	5.....
10-cans, less.....	6.....	5.....
than 10.....	10.....	7 1/2.....

Enameled and Tinned Ware—See Ware, Hollow**Escutcheon Pins—**

—See Pins, Escutcheon.

Escutcheons—

Door Lock.....	Same dis. as Door Locks.
Brass Thread.....	60@60&10%
Wid.....	25%

Expanded Metal—

List No. 5.

Lathing.....	10%
Fencing, painted sheets.....	20%
Netting, Painted Sheets.....	20%
Door Mats, Galvanized.....	25%
Window Guards, Paneled.....	15%
Tree Guards, Paneled.....	15%

Extractors, Lemon Juice—

—See Squeezers, Lemon.

Fasteners, Blind—

List No. 5.	
Nothing.....	10%
Fencing, Painted Sheets.....	20%
Letting, Painted Sheets.....	20%

Halters—
 Cover's, Rope, Jute.....60&10&10&25
 Cover's, Rope, 7-16-in., Jute.....70&25
 Cover's, Rope, 1/4-in., Hemp.....60&25
 Cover's, Adj. Rope Halters.....40&25
 Cover's, Hemp Horse and Cattle.....50&10&25
 Cover's, Jute Horse Ties.....70&25
 Cover's, Jute Cattle Ties.....70&10&25
 Cover's, Adj. Web Halters.....35&25
 Cover's, Saddlery Works Halters.....35&25
 Cover's, Saddlery Works Horse and Cattle Ties.....35&25
 Cover's, Saddlery Works Handy Web Halters.....35&25

Hammers—
Handled Hammers—
 Maydole's, list Dec. 1, '85.....25&10&35
 Buffalo Hammer Co.....50&10
 Humason & Beckley.....50&10
 A. H. Tool Co.....40&10
 Verree.....40&10
 C. Hammond & Son.....40&10
 Fayette R. Plumb.....40&10
 Artisans' Choice, A. E. Nail.....40&10
 Regular Y. & F. A. Nail.....50
 Horseshoe Turning Hammer.....50
 Other Hammers.....50&10
 Cheney's Claw.....40&10
 Cheney's Machine's & Riveting.....40&10
 Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75.....30&10
 Nelson Tool Works.....40&10
 Warner & Nobles, new list.....25&10
 Peck, Stow & Wilcox.....35&40
 Sargent's.....40&10&10

Heavy Hammers and Sledges—
 3 lb and under.....\$1.40
 5 to 10 lb.....\$1.75
 15 to 25 lb.....\$2.00
 Over 25 lb.....\$2.50
 Wilkinson's Smiths.....10&10&11

Handcuffs and Leg Irons—
 See Police Goods.

Handles—
Cross-Cut Saw Handles—
 Atkins' new list.....40
 Champion.....15
 City's Perfection.....\$ doz. \$3.00
 Sensible.....40

Iron, Wrought or Cast—
 Door or Thumb.....0 1 2 3 4
 Per doz.....\$0.90 1.00 1.08 1.35 1.50
 Roggin's Latches.....\$ doz \$3.50
 Bronze Iron Drop.....\$ doz \$1.80
 Jap'd Store Door Handles.....\$ doz \$1.80
 Plate, \$1.10; no plate, \$0.88.....net
 Barn Door, \$ doz \$1.40.....10&10
 Chest and Lifting.....70&10&10

Wood—
 Saw and Plane.....40&10&50
 Hammer, Hatchet, Axe, &c.....\$ doz \$2.00
 Brad Axl.....\$ doz \$2.00
 Hickory Firmer Chisel, ass'd.....\$ gr 4.50
 Hickory Firmer Chisel, large.....\$ gr 5.00
 Apple Firmer Chisel, ass'd.....\$ gr 5.00
 Apple Firmer Chisel, large.....\$ gr 6.00
 Socket Firmer Chisel, ass'd.....\$ gr 3.00
 Socket Framing Chisel, ass'd.....\$ gr 3.00
 J. B. Smith & Co.'s Pat File.....50
 File, assorted.....\$ gr 2.75
 Anger, assorted.....\$ gr 5.00
 Anger, large.....\$ gr 7.00
 Pat. Auger, Ives'.....\$ set \$1.25
 Pat. Auger, Douglass.....\$ set \$1.25
 Pat. Auger, Swan's.....\$ set \$1.00
 Hoe, Rake, Shovel, &c.....60&10&25

Hangers—
 Barn Door, old patterns.....70&70&5
 Barn Door, New England.....70&70&5
 Ramson Steel Anti-Friction.....55
 Orleans Steel.....55
 Hamilton Wrought Steel Track.....55
 Champion.....60&10
 Olmash Anti-Friction.....55
 Zenith for Wood Track.....55
 Sterling.....50&10&60
 Victor No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....50&10&60
 Kidder's.....50&10&60
 Boss.....60&10&60
 Best Anti-Friction.....60&10&60
 Duplex (Wood Track).....60&10&60
 Terry's Modern.....50&10&60
 Terry's Ideal.....50&10&60
 Terry's Solid.....50&10&60
 Terry's Shield.....50&10&60
 Terry's Wrought Single Strap.....50&10
 Cronk's Patent, Steel Covered.....50&10
 Carrier Steel Anti-Friction.....50&10
 Richards.....30&10&10
 Lane's New Standard.....50&10&60
 Lane's Standard.....50&10&60
 Lane's Parlor.....40
 Warner's Pat.....20&10&10
 Stearns' Anti-Friction.....20&10&10
 Stearns' Challenge.....25&10&10
 Cincinnati Nos. 1, \$2.25; 3, \$2.50; 4, \$2.50
 Paragon, Nos. 5, 5 1/2, 7 and 8.....20&10
 Crescent.....60&10&10
 Nickel, Steel, Nos. 0, \$25; 1, \$20; 2, \$15.....40&10&50
 Chicago Anti-Friction.....30&10
 Star.....40&10&40
 Barry.....50&10
 Interstate.....50&10&60
 Pendulum, Payson's.....40&10&10
 Moody.....45
 Economy, \$6.00.....50&10
 Perfection.....50&10&60
 Lundy, Steel Parlor.....50&10
 Matchless.....40
 Magic.....45&10
 Wild West.....45&10
 Moore's Elevator.....35&25
 Moore's Baggage Car Door.....35&25
 Moore's Railroad.....55

Harness Snaps—See Snaps.
Hatchets—
 American Axe and Tool Co.....40 & 10
 Blood's.....50&25
 Hunt's.....40
 Hurd's.....40
 Mann's.....40
 Underhill's.....40 & 10
 Buffalo Hammer Co.....50&25
 Fayette R. Plumb.....50&25
 C. Hammond & Son.....50&25
 Kelly's.....50&25
 Sargent's & Co.....50&25
 P. & W. Co.....50&25
 Ten Eyck Edge Tool Co.....10
 Collins.....50&25
 Schultz, Lohoff & Co.....50&25

Hay and Straw Knives—
 See Knives.

Hinges—
Blind Hinges—
 Parker.....75&25
 Huffer.....50
 Clark's, Nos. 8, 5, 40 and 60.....80&80&25
 Clark's Mortise Gravity.....50
 Sargent's, Nos. 1, 3, 5, 11, 12, 18, 75&10
 Reading's Gravity.....75&10&75&10
 Shepard's.....75&10
 Noiseless.....80
 Niagara.....80
 Buffalo.....80
 Clark's Genuine Pattern.....80
 O. S. Lull & Porter.....75&10
 Acme, Lull & Porter.....75
 Queen City Reversible.....70&10&75
 Clark's, Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3.....75&10&25
 North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....10

Gate Hinges—
 Western.....\$ doz \$4.20, 60&60&10
 N. E. Reversible.....\$ doz \$5.60, 60&60&10
 Clark's, Nos. 1, 2, 3.....60&10&25
 N. Y. State.....\$ doz \$4.90, 60&60&10
 Automatic.....\$ doz \$12.50, 50
 Shepard's.....60&10&25

Spring Hinges—
 Geer's Spring and Blank Butte.....40
 Union Spring Hinge Co's list, March, 1886.....20
 Barker's Double Acting.....25
 Union Mfg. Co.....30
 Bommer's.....30
 Buckman's.....15&20
 Chicago.....30
 Bardsley's Patent Checking.....15
 Acme.....25&10
 U. S.....25&10
 Empire and Crown.....25
 Hero and Monarch.....55
 American, Gem and Star.....20
 Oxford.....20
 Royal.....60&10
 Reliable.....60
 Champion.....60
 No. 25 Unbreakable.....60
 J. G. C. Covered, \$ gro. \$30.....50&25
 Samson.....60&10&75
 Wilkes, No. 1, \$ gro. \$16; No. 2, \$13; Devore, No. 1.....\$ gro. \$13.00
 Rex.....\$ gro. \$13.00
 Maynard, S. & O. Pat.....\$ gro. \$12.00
 New Idea Nos. 1 and 10.....\$ gross \$13.00
 New Idea Dbl. Acting.....45
 Ideal No. 3.....\$ gross \$10.00
 Stearns' Noiseless Floor Hinge, \$ set, \$5.00.....20&10&30

Wrought Iron Hinges—
 List February 14, 1891.....50&10&50&10&55
 Strap and T.....50&10&50&10&55
 Corrugated Strap and T.....50&10&55
 Screw Hook and T.....\$ doz \$1.00, 4
 Strap.....\$ doz \$1.00, 4
 Screw Hook and Eye.....\$ doz \$1.00, 4
 Rolled Blind Hinges, Nos. 32 and 34.....50&10
 Rolled Blind Hinges, Nos. 232 and 234.....55&10
 Rolled Plate.....70&10
 Rolled Raised.....70&10
 Plate Hinges (8, 10 & 12 in., \$ doz \$1.00, 5
 "Providence" over 12 in., \$ doz \$1.00, 4

Hoes—
Eye—
 D. & H. Scovill.....20
 Lane's Crescent, Planters' Pattern.....45&25
 Lane's Razor Blade, Scovill Pattern.....45&25
 Maynard, S. & O. Pat.....45&25
 Sandusky Tool Co., S. & O. Pat.....60&5
 Am. Axe and Tool Co., S. & O. Pat.....60&10
 Chatanooga Tool Co., S. & O. Pat.....60&10
 Grub.....60&10

Handled—
 Garden, Mortar, &c.....70&70&5&25
 Planter's, Cotton, &c.....70&70&5&25
 Warren Hoe.....60&10&25
 Magic.....\$ doz \$4.00

Hog Rings and Ringers—
 See Rings and Ringers—

Holisting Apparatus—
 See Machines, Holisting.

Hollow-Ware—
 See Ware, Hollow.

Holders—
Bag—
 Sprengle's Pat.....\$ doz \$18.....60

Bit—
 Extension.....40&40&10
 Barber's, \$ doz \$15.00.....40&40&10
 Ives, \$ doz \$20.00.....60&50&10
 Diagonal.....\$ doz \$24.00, 40&55
 Angular.....\$ doz \$24.00, 40&55

File and Tool—
 Bals Pat.....\$ doz \$4.00, 25
 Nicholson File Holders.....20

Sash—
 Motley's Adj. Sash, Medium Size.....\$ doz \$1.20, 40

Hooks—
Cast Iron—
 Bird Cage, Sargent's List.....60&10&10
 Bird Cage, Reading.....60&10&10
 Clothes Line, Sargent's list.....70
 Clothes Line Moore's.....70

Clothes Line, Reading list.
 60&10&60&10&10
 Ceiling, Sargent's list.....55&10&10
 Harness, Reading list.....55&10&10
 Coat and Hat, Sargent's list.....55&10&60&10
 Coat and Hat, Reading.....50&10&50&10&10
 Coat and Hat, Moore's.....70

Wrought Iron—
 Cotton.....\$ doz \$1.25
 Cotton Pat. (N. Y. Mallet and Handle) Wks.....30
 Tassel and Picture, T. & S. Mfg. Co.....60
 Wrought Staples Hooks, &c.....See Wrought Goods

Wire—
 Wire Coat and Hat, Gem, list April, 1886.....60&80&10
 Wire Coat and Hat, Miles, list April, 1886.....50&50&10
 Indestructible Coat and Hat.....45&45&55
 Wire Coat and Hat, Standard.....60&60&10
 Handy Hat and Coat.....60&10&60
 Ceiling Ceiling Hooks.....60&10&60
 Belt.....80&15&60&20
 Atlas, Coat and Hat.....65
 Williamson's Bird Cage Hooks, list April, 1892.....40
 Bright Wire Goods—See Wire.

Miscellaneous—
 Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25
 Nolin's Grass.....\$ doz \$2.25
 Bush.....55&30
 Whiffletree—Patent.....55
 Hooks and Eyes—Malleable Iron.....70&70&10
 Hooks and Eyes—Brass.....60&10&10
 Fish Hooks, American.....50
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes—
 See Shoes, Horse.

Hose, Rubber—
 Competition, Fair quality.....75&75&10
 Competition, Low Grade.....80&80&10
 Standard.....70&10&70&10&55
 Extra.....60&10&60&10&10
 N. Y. B. & P. Co., Para.....25&55
 N. Y. B. & P. Co., Extra.....40&55&50
 N. Y. B. & P. Co., Dundee.....60&60&55
 Cotton Garden, 1/4 in., coupled:
 Fair Quality, \$ doz.....75
 Good Quality, \$ doz.....85

Huskers—
 Blair's Adjustable.....\$ gr \$2.00
 Blair's Adjustable Clipper.....\$ gr 7.00
 Hubbard's Solid Steel.....\$ gr 4.50

Indurated Fiber Ware—
 See Ware, Indurated Fiber.

Irons.
Sad—
 From 4 to 10, at factory.....\$ 100 lb. \$2.30&\$2.40
 Self-Heating.....\$ doz \$8.00
 Self-Heating Tallow.....\$ doz \$18.00
 Mrs. Potts' Sad Irons, per set:
 No. 50.....55
 No. 55.....65
 No. 60.....65
 No. 65.....65
 No. 70.....65
 No. 75.....65
 No. 80.....65
 No. 85.....65
 No. 90.....65
 No. 95.....65
 No. 100.....65
 No. 105.....65
 No. 110.....65
 No. 115.....65
 No. 120.....65
 No. 125.....65
 No. 130.....65
 No. 135.....65
 No. 140.....65
 No. 145.....65
 No. 150.....65
 No. 155.....65
 No. 160.....65
 No. 165.....65
 No. 170.....65
 No. 175.....65
 No. 180.....65
 No. 185.....65
 No. 190.....65
 No. 195.....65
 No. 200.....65
 No. 205.....65
 No. 210.....65
 No. 215.....65
 No. 220.....65
 No. 225.....65
 No. 230.....65
 No. 235.....65
 No. 240.....65
 No. 245.....65
 No. 250.....65
 No. 255.....65
 No. 260.....65
 No. 265.....65
 No. 270.....65
 No. 275.....65
 No. 280.....65
 No. 285.....65
 No. 290.....65
 No. 295.....65
 No. 300.....65
 No. 305.....65
 No. 310.....65
 No. 315.....65
 No. 320.....65
 No. 325.....65
 No. 330.....65
 No. 335.....65
 No. 340.....65
 No. 345.....65
 No. 350.....65
 No. 355.....65
 No. 360.....65
 No. 365.....65
 No. 370.....65
 No. 375.....65
 No. 380.....65
 No. 385.....65
 No. 390.....65
 No. 395.....65
 No. 400.....65
 No. 405.....65
 No. 410.....65
 No. 415.....65
 No. 420.....65
 No. 425.....65
 No. 430.....65
 No. 435.....65
 No. 440.....65
 No. 445.....65
 No. 450.....65
 No. 455.....65
 No. 460.....65
 No. 465.....65
 No. 470.....65
 No. 475.....65
 No. 480.....65
 No. 485.....65
 No. 490.....65
 No. 495.....65
 No. 500.....65
 No. 505.....65
 No. 510.....65
 No. 515.....65
 No. 520.....65
 No. 525.....65
 No. 530.....65
 No. 535.....65
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 No. 565.....65
 No. 570.....65
 No. 575.....65
 No. 580.....65
 No. 585.....65
 No. 590.....65
 No. 595.....65
 No. 600.....65
 No. 605.....65
 No. 610.....65
 No. 615.....65
 No. 620.....65
 No. 625.....65
 No. 630.....65
 No. 635.....65
 No. 640.....65
 No. 645.....65
 No. 650.....65
 No. 655.....65
 No. 660.....65
 No. 665.....65
 No. 670.....65
 No. 675.....65
 No. 680.....65
 No. 685.....65
 No. 690.....65
 No. 695.....65
 No. 700.....65
 No. 705.....65
 No. 710.....65
 No. 715.....65
 No. 720.....65
 No. 725.....65
 No. 730.....65
 No. 735.....65
 No. 740.....65
 No. 745.....65
 No. 750.....65
 No. 755.....65
 No. 760.....65
 No. 765.....65
 No. 770.....65
 No. 775.....65
 No. 780.....65
 No. 785.....65
 No. 790.....65
 No. 795.....65
 No. 800.....65
 No. 805.....65
 No. 810.....65
 No. 815.....65
 No. 820.....65
 No. 825.....65
 No. 830.....65
 No. 835.....65
 No. 840.....65
 No. 845.....65
 No. 850.....65
 No. 855.....65
 No. 860.....65
 No. 865.....65
 No. 870.....65
 No. 875.....65
 No. 880.....65
 No. 885.....65
 No. 890.....65
 No. 895.....65
 No. 900.....65
 No. 905.....65
 No. 910.....65
 No. 915.....65
 No. 920.....65
 No. 925.....65
 No. 930.....65
 No. 935.....65
 No. 940.....65
 No. 945.....65
 No. 950.....65
 No. 955.....65
 No. 960.....65
 No. 965.....65
 No. 970.....65
 No. 975.....65
 No. 980.....65
 No. 985.....65
 No. 990.....65
 No. 995.....65
 No. 1000.....65

Knives—
 Lock, Ass'n list Dec. 30, 1886.....65&10&70
 Eagle, Cabinet, &c.....33&25
 Hotchkiss' Brass Blanks.....40
 Hotchkiss' Copper and Tinned.....40
 Hotchkiss' Pad and Cab.....35
 Wollensak Tinned.....50&10

Keys—
 Lock, Ass'n list Dec. 30, 1886.....65&10&70
 Eagle, Cabinet, &c.....33&25
 Hotchkiss' Brass Blanks.....40
 Hotchkiss' Copper and Tinned.....40
 Hotchkiss' Pad and Cab.....35
 Wollensak Tinned.....50&10

Knife Sharpeners—
 See Sharpeners, Knife.

Knives—
Butcher, Shoe, &c.
 Wilson's Butcher Knives, list Dec 8, 1890.....25
 Ames' Butcher Knives.....25
 Foster Bros' Butcher, &c.....40
 Jordan's A. A. 1 Butcher's, list.....40&10
 Nichols' Butcher Knives.....40&10
 W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.30, &c.
 Ames' Shoe Knives.....20&25
 Ames' Bread Knives, \$ doz \$1.50, 15&20
 Moran's Shoe and Bread.....20&20&10
 Hay and Straw—See Hay Knives.
 Table and Pocket—See Cutlery.

Corn—
 Bradley's.....10
 Wadsworth's.....25&25&10

Drawing—
 P. S. & W.....75&75&10&55
 Mix.....75&75&10&55
 New Haven.....60&10&60&10&55
 Merrill.....60&10&60&10&55
 Douglass.....75&75&55
 Watrous.....15&10

L. & I. J. White.....80&55
 Bradley's.....25&25
 Adjustable Handle.....25&25
 Wilkinson's Folding.....25&25

Hay and Straw—
 Lightning, from jobbers.....\$3.00&\$3.00
 Wadsworth's.....40&75&40&10
 Carter's Needle.....\$ doz \$11.00&\$11.50
 Heath's.....\$ doz \$13.00&\$13.50
 Nolin's Hay.....\$ doz \$7.00&\$7.00

Mincing—
 Am. (24 quality), \$ gr. 1 blade, \$7
 2 blades, \$12; 3 blades, \$18.....net
 Lothrop's.....20&10
 Smith's, \$ doz., Single, \$2; Double \$3
 Knapp & Cowles.....50&10&50
 Buffalo Adjustable.....\$ doz \$3.00, 55&45

Knobs—
 Door, Mineral.....60&55
 Door, Por. Jap'd.....70&75
 Door, Por. Nickel.....\$2.00&\$2.25
 Door, Por. Plated Nickel.....\$2.00&\$2.25
 Drawer, Porcelain.....60&10&60&10
 Hemacite Door Knobs.....40&10&50
 Yale & Towne Wood, list Dec., 1885.....40
 Base, Rubber Tip.....70&10&55
 Picture, Judd's.....60&10&10&70
 Picture, Sargent's.....70&10
 Picture, Hemacite.....35&25
 Shutter, Porcelain.....65&10
 Carriage, Jap.....\$ gr 80¢, 60&10
 Bardsley's Wood Door, Shutter, &c.....15

Ladders.
 Davies Extension and Single.....20&25

Ladies—
 Melting, Sargent's.....60&60&55
 Melting, Reading.....35&10
 Melting, P. S. & W.....55&10&40
 Melting, Warner's.....30

Lanterns—
Tubular—
 Regular, with Guard.....\$ doz \$3.50
 K., with Guard.....\$ doz \$3.75
 Side Lift, with Guard.....\$ doz \$4.00
 Square Lift, with Guard.....\$ doz \$4.25
 Anti-Friction, with Guard.....\$ doz \$4.50
 Brass Plated, Sq. Lift, Guard.....\$ doz \$5.50
 Cop. Plated, Sq. Lift, Guard.....\$ doz \$5.50

Bull's Eye Police—
 2 1/2-inch regular.....\$ doz \$3.00
 3-inch regular.....\$ doz \$3.50
 2 1/2-inch flash light.....\$ doz \$4.00
 3-inch flash light.....\$ doz \$4.50

Lawn Mowers—
 See Mowers, Lawn.

Leaders, Cattle—
 Humason, Beckley & Co.'s.....70
 Sargent's.....70&10&70&10&10
 Hotchkiss.....60&10
 Peck, Stow & W. Co.....60&10

Lemon Squeezers—
 See Squeezers, Lemon.

Lifters, Transom—
 Wollensak's:
 Class 3 and 4, Bronzed Iron.....60
 Class 3 and 4, Bronze Metal.....50
 Class 3 and 4, Brass.....50
 Skylight Lifters.....35
 Reiter's, list Feb. 20, 1891.....60&60&10
 Bronzed Iron Rod.....50
 Brass, Real Bronze or Nickel Plate, 504
 Excelsior.....50&10&55
 Shaw's.....60&10
 Payson's:
 Universal.....60
 Solid Grip.....60&10&60&10
 Imperial.....60&10

Lines—
 Cotton and Linen Fish.....50
 Chalk.....60
 Mason's Linen, 84 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....55
 Cotton Chalk.....55
 Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50, 10
 Silver Lake, Braided No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
 Gro.....\$ doz \$1.50, 15
 Mason's Linen, No. 8 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50
 Mason's Colored Cotton.....45
 Wire Clothes, Nos. 18 19 20 100 ft.....\$3.50 \$3.00 \$2.50
 Ventilator Cord, Samson Braided, White or Drab Cotton, \$ doz \$7.50, 30
 Ossawa Mills, Chalk, Twisted, 60%; Chalk, Soft Braided, 50% Chalk, Braided, 25%.

Links, Open—
 Terry's—per gro.:
 Nos.....2 3 4
 \$6.00 8.00 12.00 16.00

Locks, &c.—
Cabinet—
 Eagle, Gaylord Par. list March '84, rev. for and Corbin. Jan. 1, '85, \$34&35
 Deitz, Nos. 36 to 39.....40
 Deitz, Nos. 61 to 63.....40&10
 Deitz,

Brittan, Graham & Mathes, list Jan. 1890. 60x10x10 39x42x2
Barnes Mfg. Co. 40x40x10 net prices
Yale 30x30x10 30x30x10
Delta Flat Key 30x30x10
Bomer's Night Latches 50x10x10
Brooklyn Latches 50x10x10
Warner's Burglar Proof 30x30x10, 50x50x10
Elevator 39x42x2
Moore's 39x42x2
Padlocks
List June 10, 1891. 50x25x2
Norwich Lock Mfg. Co., old list. 50x25x2
Yale Lock Mfg. Co.'s net prices
Eagle 40x25x2
Eureka, Eagle Lock Co. 40x25x2
Bomer's Nos. 0 to 91 30x30x10
Romer's Scandinavian, &c., Nos. 100 to 150 15x15x10
A. E. Delta 40x25x2
Champion Padlocks 40x25x2
Hotchkiss 30x30x10
Star 60x30x10
Horseshoe 30x30x10
Barnes Mfg. Co. 40x40x10
No. 10 30x30x10
Scandinavian 30x30x10
E. T. Fraim's Keystone Scandinavian 30x30x10
Nos. 119, 120, 130 and 140 30x30x10
Other Nos. 30x30x10
Ames Sword Co. up to No. 150 40x25x2
Ames Sword Co. above No. 150 50x25x2
Blaymaker, Barry & Co. 30x30x10
No. 1010 line 30x30x10
No. 41 line 30x30x10
No. 61 line 30x30x10
No. 21 line 30x30x10
Sash, &c.
Clark's No. 1, \$10; No. 2, \$8 39x42x2
Ferguson's 39x42x2
Victor 60x10x10
Walker's 10x10x10
Attwell Mfg. Co. 25x39x42
Reading 60x10x10
Hammond's Window Springs 40x25x2
Common Sense, Jap'd, Cop'd and Br'd 30x30x10
Common Sense, Nickel Plated 30x30x10
Universal 30x30x10
Kempshall's Gravity 30x30x10
Kempshall's Model 60x10x10
Corbin's Daisy, list Feb. 15, 1888 70x30x10
Fayson's Perfect 60x10x10
Hugonin's Sash Balances 25x25x2
Hugonin's New Sash Locks 25x25x2
Ives Patent 60x10x10
Fish (Liesche's pat.) No. 100, gr. \$8 30x30x10
No. 105, gr. \$10 30x30x10
Davis, Bronze, Barnes Mfg. Co. 30x30x10
Champion Safety list January 1898 70x30x10
Security 70x30x10
Giant, list Jan., 1892 70x30x10
Wolcott's 60x10x10
Monarch 50x25x2
Lumber Tools
See Tools, Lumber.
Lustro
Four-ounce bottles 30x30x10
gross 17x10x10
Machines.
Boring
Without Angers. Upright. Angular.
Douglas 5.50 6.75
Snell's, Rice's Pat. 5.50 6.75
Jennings 5.50 6.75
Other Machines. 2.35 2.75
Phillips Patent 7.00 7.50
with Augur. 7.00 7.50
Weller's Falls. 3.60
Boss, Carpenters' 7.50
Boss, Ship Bldrs' 3.85
Fluting
Knox, 4 1/2-inch Rolls 3.25 each
Knox, 6-inch Rolls 3.60 each
Eagle, 3 1/2-inch Rolls 2.15
Eagle, 5 1/2-inch Rolls 2.85
Crown, 4 1/2 in., \$3.60; 6 in., \$4.00; 8 in., \$4.50 each
Crown Jewel, 6 in. 3.50 each
American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each
Domestic Fluter 3.50
Geneva Hand Fluter, White Metal, 1.50
doz \$12, 25c
Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25
Shepard Hand Fluter, No. 85, per doz 15.50
Shepard Hand Fluter, No. 110, doz 11.00
Shepard Hand Fluter No. 95, doz 8.00
Combined Fluter and Sad Iron 15.00
Holsting
Moore's Hand Holst, with Lock Brake 20x20x10
Moore's Anti-Friction Differential Pulley Block 20x20x10
Moore's Rope Differential Pulley Block 60x30x10
Energy Mfg. Co.'s 25x25x2
See also Blocks.
Washing
Anthony Wayne, doz No. 1, \$42; No. 2, \$36; No. 3, \$42
Wayne American 30x30x10
Western Star 30x30x10
Wells 30x30x10
Fair and Square 30x30x10
Mallets
Hickory 20x10x10
Lignumvite 20x10x10
E. & L. Block Co., Hickory & L. V. 30x30x10
Mattocks 60x10x10
Regular list. 60x10x10
Measures
Standard Fiberglass, No. 1, peck 3.00
dozen, \$3.50; 1/4 peck, \$3.00
Meat Cutters
See Cutters, Meat.
Menders, Harness
For doz. 2.00
Milk Cans 30x30x10

Mills
Coffee
Box and Side, list Jan. 1, 1888. 60x60x5
Net prices are often made which are lower than above discount.
American, Enterprise Mfg. Co., list Jan. 17, 1898. 30x30x10
The Swift, Lane Bros. 30x30x10
Wadde's New Box Mills, Ideal Brand, New List. 60x30x10
Mincing Knives
See Knives, Mincing.
Molasses Gates
See Gates, Molasses.
Money Drawers
See Drawers, Money.
Mowers, Lawn
Best Machines: 10-in., \$4; 12-in., \$4.50; 14-in., \$5; 16-in., \$5.50; 18-in., \$6.
Low-Grade Machines: 10-in., \$3; 12-in., \$3.25 14-in., \$3.50 each
Muzzles
Safety 30x30x10
Nails
Cut and Wire. See Trade Report.
Wire Nails, Papered. 85x25x2
Association list, May 1, '92. 70x25x2
Tack Mfrs. list. 70x25x2
Hungarian, Finishing, Upholsterers', &c. See Tacks.
Horse
Nos. 6 7 8 9 10
American 9x9 9x9 9x9 9x9
Ausable 25x25 25x25 25x25 25x25
Clinton, Fin. 19x17 16x15 14x13 30x25x2
Essex 25x25 25x25 25x25 25x25
Lyra 9x9 9x9 9x9 9x9
Snowden 9x9 9x9 9x9 9x9
Standard 23x21 20x19 18x16 15x13
Vulcan 23x21 20x19 18x16 15x13
Northwestern 23x21 20x19 18x16 15x13
C. B. K. 25x23 22x21 21x20 20x19
A. C. 25x23 22x21 21x20 20x19
Maud S. 25x23 22x21 21x20 20x19
Champlain 25x23 22x21 21x20 20x19
Champion 25x23 22x21 21x20 20x19
Capewell 19x18 17x16 15x14 13x12
Ames 23x21 20x19 18x16 15x13
Western 23x21 20x19 18x16 15x13
Empire Bronzed 13x14 12x11 11x10 10x9
Picture
Brass Head, Sargent's list. 60x60x10
Brass Head, Combination list. 50x10x10
Porcelain Head, Sargent's list. 50x10x10
Porcelain Head, Combination list. 40x10x10
Niles' Patent 40x10x10
Nail Pullers 30x30x10
Nail Sets 30x30x10
Nut Crackers
See Crackers, Nut.
Nuts 30x30x10
List Dec. 18, 1889. Square. Hex.
Hot Pressed 3.80 6.50 off list
Cold Funched 5.00 6.10 off list
In packages of 100 lb, add 10c
net; in packages less than 100 lb, add 1 1/2c lb, net.
Oakum
Best or Government. 60x60x10
U. S. Navy. 60x60x10
Navy. 60x60x10
Oil Tanks 30x30x10
See Tanks, Oil.
Oilers
Zinc and Tin. 65x10x70x5
Brass and Copper. 50x10x50x10
Malleable, Hammers Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40
Malleable, Hammers' Old Pattern, same list. 45x10x50
Prior's Pat. or "Paragon" Zinc. 60x10x10
Prior's Pat. or "Paragon" Brass. 50x10x10
Olmead's Tin and Zinc. 50x10x10
Olmead's Brass and Copper. 50x10x10
Broughton's Zinc. 60x10x10
Broughton's Brass. 50x10x10
Steel, Draper & Williams. 50x10x10
Openers, Can
Messenger's Comet. 30x30x10
American. 30x30x10
Duplex. 30x30x10
Lyman's. 30x30x10
No. 4, French. 30x30x10
No. 5, Iron Handle. 30x30x10
Eureka. 30x30x10
Sardine Solsors. 30x30x10
Star. 30x30x10
Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50
Excelstor No. 1 \$2.50; No. 2, \$1.50 40x25x2
World's Best 30x30x10
No. 2, \$2.40; No. 3, \$3.00 50x10x10
Universal 30x30x10
Domestic 30x30x10
Champion 30x30x10
Moore's 30x30x10
Packing, Steam
Rubber
Standard. 70x70x10
Extra 60x60x10
N. Y. B. & P. Co., Standard 50x10x10
N. Y. B. & P. Co., Empire 50x10x10
N. Y. B. & P. Co., Salamander 25x25x2
Jenkins' Standard 30x30x10
Miscellaneous
American Packing 10x11x10
Russia Packing 14x14x10
Italian Packing 13x14x10
Cotton Packing 15x17x10
Jun 14x14x10
Pails
Creamery
S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25
er doz. 5x10x10

Galvanized
Quarts 10 13 14
Hill's Light Weight 30x30x10
Hill's Heavy Weight 30x30x10
Kellogg's 25x25x2
Sidney, Shepard & Co. 25x25x2
Iron Clad 25x25x2
Fire Buckets 25x25x2
Buckets 25x25x2
Indurated Fiber Ware 25x25x2
Star Pails, 12 qt. 30x30x10
Milk, 14 qt. 30x30x10
Stable, 14 qt. 30x30x10
Fire Pails, deep 30x30x10
Fire Pails, round bottom 30x30x10
Standard Fiber Ware
Plain. Deord
Water Pails, 12 qt., doz 30x30x10
Dairy Pails, 14 qt., doz 30x30x10
Fire Pails, No. 12 qt., doz 30x30x10
Fire Pails, No. 2, 14 qt., doz 30x30x10
Sugar Pails. 5.50 6.00
Horse Pails. 4.50 5.00
Buggy Pails. 3.50 4.00
Slop Jars (bal. trap). 7.50 8.50
Chamber Pails, 14 qt. 6.00 7.00
Pans
Dripping
Small sizes 5x5x5
Large sizes 5x5x5
Silver & Co. (Covered). 40x25x2
Fry
Standard List
No. 1 2 3 4 5 6 7 8 9 10
doz. \$3.00 \$3.75 \$4.25 \$4.75 \$5.25 \$5.75 \$6.25 \$6.75 \$7.25 \$7.75
Polished, regular goods 75x75x10
Acme Fry Pans 60x30x10
Dust
Steel Edge, No. 1. 30x30x10
Roasting and Baking
Columbian, S. & Co., Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each 60x10x10
Paper and Cloth
Sand and Emery
List April 19, 1888. 50x10x50x10
Sibley's Emery and Crocus Cloth 30x30x10
Parers
Apple
Advance 30x30x10
Baldwin 30x30x10
Bonanza 30x30x10
Daisy 30x30x10
Dandy 30x30x10
Eclipse 30x30x10
Eureka, 1888 30x30x10
Family Bay State 30x30x10
Favorites 30x30x10
Gold Medal 30x30x10
Ideal 30x30x10
Improved Bay State 30x30x10
Little Star 30x30x10
Monarch 30x30x10
New Lightning 30x30x10
Orion 30x30x10
Penne 30x30x10
Perfection 30x30x10
Pomona 30x30x10
Rocking Table 30x30x10
Turn Table 30x30x10
Victor 30x30x10
Variety 30x30x10
White Mountain 30x30x10
72 30x30x10
78 30x30x10
Potato
White Mountain 30x30x10
Antrim Combination 30x30x10
Hoosier 30x30x10
Saratoga 30x30x10
Pencils
Faber's Carpenters 50x10x10
Faber's Round Glt. 50x10x10
Dixon's Lead 50x10x10
Dixon's Lumber 50x10x10
Dixon's Carpenters 50x10x10
Pencils, Soapstone
See Crayons.
Pickers, Fruit
Prize Fruit Pickers 50x10x10
Picks
Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00. 60x10x60x10
Picture Nails
See Nails, Picture.
Pinking Irons
See Irons, Pinking.
Pins
Humason, Beckley & Co.'s 60x10x10
Sargent & Co.'s 60x10x10
Peck, Stow & W. Co. 50x10x50x10
Curtain
Silvered Glass net
White Enamel net
Escutcheon
Iron, list Nov. 11, 1885. 50x10x50x10
Brass 60x60x10
Pipe, Wrought Iron
List April 13, 1893.
1 1/4 and under, Plain. 57x10x10
1 1/4 and under, Galv. 50x10x10
1 1/4 and over, Plain. 67x10x10
1 1/4 and over, Galv. 67x10x10
Boiler Tubes, list Oct. 24, 1892. 65x10x10
Casing, list Nov. 5, 1892. 52x10x10
Insulated Joint Casing, list Nov. 16, 1892. 47x10x10
Steel Boiler Tubes. 27x10x10
Cold Drawn Seamless Steel Tubing. 50x10x10
Planes and Plane Irons
Wood Planes
Molding 40x40x10
Bench, First quality 45x45x10
Bench, Second quality 50x50x10
Bailey's (Stanley & L. Co.) 50x10x10
Iron Planes
Bailey's (Stanley & L. Co.) 50x10x10
Miscellaneous Planes (Stanley & L. Co.) 25x10x10
Steele's Iron Planes. 50x50x10
Merriden Mal. Iron Co.'s 50x50x10
David Iron Planes. 60x60x10
Birmingham Plane Co. 60x60x10
Gage Tool Co.'s Self-Setting. 20x10x10
Chaplin's Iron Planes. 50x50x10
Sargent's. 60x60x10
Standard Tool Co. 60x60x10
Plane Irons
Butcher's. 50x50x10
Buck Bros. 50x50x10

Auburn Thistle. 30x10x30x10
Ohio. 30x10x30x10
Sandusky. 30x10x30x10
Stanley R. & L. Co. 50x10x10
Plates
Felloe 30x30x10
Pilers and Nippers
Button's Patent. 60x30x10
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 30x30x10
Humason & Beckley Mfg. Co. 50x50x10
Lindsay's Giant. 50x50x10
Gas Pliers, Custard's Nickel Plated. 60x30x10
Eureka Pliers and Nippers. 45x25x2
Russell's Parallel. 25x25x2
P. S. & W. Cast Steel. 25x25x2
P. S. & W. Tinner's Cutting Nippers. 10x10x10
Carew's Pat. Wire Cutters. 10x10x10
Correll's Parallel. 30x30x10
Cronk's 4 in., \$15.00; 10 in., \$30.00 30x30x10
Cronk's Button Pattern. 50x10x50x10
Cronk's Carrier Pliers. 60x60x10
Plumbs and Levels
Regular list. 75x10x75x10
Stanley's Duplex 30x10x10
Stanley's Handy 30x10x10
Dilston's 40x10x10
Cook's 40x10x10
Fork Levels 70x10x70x10
Davis Iron Levels 30x10x10
Davis Inclometers. 10x10x10
Poachers, Egg
Buffalo Steam Egg Poachers, 30x30x10
No. 1, \$6.00; No. 2, \$9.00. 30x30x10
Silver & Co., 6-Ring, 30x30x10
Ring. 30x30x10
Pokes, Animal
Bishop's I. X. L. 30x30x10
Bishop's Monarch 30x30x10
Bishop's Pioneer 30x30x10
Bishop's American 30x30x10
Eagle, Double Stale. 30x30x10
Eagle, Single Stale. 30x30x10
Buckeye, Single Stale. 30x30x10
Holding 30x30x10
Metallic Horse Poke. 30x30x10
Police Goods
R. I. Tool Co., Handcuffs, \$15.00 30x30x10
R. I. Tool Co., Leg Irons, \$25.00 30x30x10
Towers 30x30x10
Daley's Improved Handcuffs, 2 Hands, Polished 30x30x10
\$67.00; 3 hands, Polished, \$72.00; Nickleled, \$84.00 30x30x10
J. P. Lovell's Police Goods. 30x30x10
Polish
Metal
Prestoline 30x30x10
Prestoline Paste. 30x30x10
Gaston's Silver Compound. 30x30x10
Stove
Joseph Dixon's 30x30x10
Gem 30x30x10
Gold Medal 30x30x10
Lustro 30x30x10
Ruby 30x30x10
Rising Sun, 100 lots 30x30x10
Dixon's Plumage 30x30x10
Boynton's Noon Day 30x30x10
Parlor Pride Stove Enamel, 30x30x10
Yates' Liquid, 2 3 5 10 gal 30x30x10
Yates Standard Paste Polish, 10 cans, 30x30x10
Jet Black 30x30x10
Japanese 30x30x10
Firestone 30x30x10
Diamond O. K. Enamel 30x30x10
Bonnell's Liquid Stove Polish, 30x30x10
Bonnell's Paste Stove Polish, 30x30x10
Black Eagle Benzine Paste, 5 and 10 cans. 30x30x10
Black Jack Water Paste, 5 and 10 cans. 30x30x10
Nickel Plate Paste. 30x30x10
Crown Paste. 30x30x10
Crown Paste in 5 and 10 lb pails, 30x30x10
Black Flag, 5 and 10 lb pails, 30x30x10
Black Flag, 5 and 10 lb pails, 30x30x10
Black Flag, liquid, in bottles, 30x30x10
Diamond Rock Nickel Cleaner. 30x30x10
Raven Liquid, 6 oz. bottles. 30x30x10
Raven Liquid, 8 oz. bottles. 30x30x10
Raven Water Polish, large boxes 30x30x10
Raven Paste in 5 lb. pails (cases of 6 pails), 30x30x10
Poppers, Corn
Round or Square, 30x30x10
1 qt. 30x30x10
1 1/2 qt. 30x30x10
2 qt. 30x30x10
Post Hole and Tree Augers and Diggers
See Diggers, Post Hole, &c.
Potato Parers
See Parers, Potato.
Pots
Glue
Tinned. 40x10x40x10
Enamelled. 40x10x40x10
Family, Howe's "Eureka" 40x10x40x10
Family, L. F. C.'s "Handy" 40x10x40x10
Powder
In Canisters
Fine Sporting, 1 lb each. 0.90
Duck, 1 lb each. .60
Rifle, 1 lb each. .30
Rifle, 1/2 lb each. .18
In Kegs
Rifle, 25-lb kegs 3.50
Rifle, 12 1/2-lb kegs 2.00
Rifle, 6 1/2-lb kegs 1.15
Duck, 25-lb kegs 11.00
Duck, 12 1/2-lb kegs 5.75
Duck, 6 1/2-lb kegs 3.00
Presses
Fruit and Jelly
Interprise Mfg. Co. 25x25x2
Jenks 30x30x10
Shepard's Queen City 40x25x2
Silver & Co. 30x30x10
Pruning Hooks and Shears 30x30x10

Pullers, Nail-

Grant, No. 1.....	doz., \$18.00, 38¢
Grant, No. 2.....	doz., \$18.00, 10¢
Falcan.....	doz., \$15.00, 10¢
Belgian.....	doz., \$9.00, 25¢
Belgian.....	doz., \$24.00, 40¢
Belgian.....	doz., \$24.00, 40¢
Belgian.....	doz., \$24.00, 40¢

Pulleys-

Hot House, Awning, &c.....	60¢@70¢
Jannaped Screw.....	60¢@10¢
Brass Screw.....	70¢
Jannaped Side.....	60¢@10¢
Moore's Side, Anti Friction.....	60¢
Moore's Ceiling or End, Anti Friction.....	40¢
Moore's Dumb Waiter, Anti Friction.....	50¢
Moore's Electric Light.....	35¢
Jannaped Clothes Line.....	60¢@10¢
Hay Fork, Solid Eye, \$4.00; Swivel.....	\$4.50
Hay Fork, "Anti Friction," 5 in. solid.....	\$6.70
Hay Fork, "F" Common and Patent.....	60¢
Hay Fork, Tarbox Pat. Iron.....	20¢
Hay Fork, Reed's Self-Lubricating.....	60¢
Hay Fork, Moore's Anti Friction 5 in. Wheel.....	\$12.00
Shade Rack.....	45¢
Tackle Block.....	45¢
Shepard's Niagara, No. 25, doz 23¢ net.....	23¢
Common Sense.....	60¢
Empire.....	60¢
Ideal, Nos. 2, 4, 10 & 15, doz less 1¢.....	40¢
Acme.....	doz net
On bid, lots.....	5¢
Ideal, Nos. 25 and 55, doz 22¢ net.....	22¢

Pumps-

Ostern, Best Makers.....	60¢@80¢
Pitcher Spout, Best Makers.....	87¢@70¢
Pitcher Spout, Cheaper G'ds.....	76¢@75¢

Punches-

Saddler's or Drive, good.....	doz., 80¢@85¢
Bemis & Call Co.'s Springfield Socket.....	50¢
Bemis & Call Co.'s Springfield Socket.....	55¢
Spring, good quality.....	doz., \$2.50@3.50
Spring, Leach's Pat.....	50¢
Bemis & Call Co.'s Spring.....	50¢@55¢
Bemis & Call Co.'s Check.....	55¢
Solid Tinners', P. S. & W. Co., doz.....	\$1.44
Tinners' Hollow Punches, P. S. & W. Co.....	20¢@25¢
Rice Hand Punches.....	15¢
Avery's Revolving.....	40¢
Avery's Sawset and Punch-See Sawsets.....	20¢@25¢
Niagara Hollow Punches.....	20¢@25¢
Niagara Solid Punches.....	55¢

Rail-

Sliding Door, Wrt Brass.....	doz., 35¢, 40¢
Sliding Door, Bronzed Wrt Iron.....	doz., 35¢, 40¢
Sliding Door, Iron, Painted.....	doz., 4¢, 40¢
Barn Door, Light, 1 in.....	doz., \$2.00
For 100 feet.....	\$2.00 2.50 3.10, 10¢
B. D. for N. E. Hangers.....	Small. Med. Large.
Per 100 feet.....	\$3.15 2.70 3.25 Net
Terry's Steel Rail.....	doz., 4¢, 45¢
Victor Track Rail, 7¢ foot.....	50¢@55¢
Carrier, double braced, Steel Rail.....	30¢@40¢
Foot.....	30¢@40¢
Lundy Parlor Door, Planed Edge.....	doz., 7¢, 7¢
Moore's Steel Rail.....	25¢@10¢
Moody Steel Rail.....	doz., 5¢, 45¢

Rakes-

Cast Steel, Association g'ds.....	70¢@75¢@82¢
Cast Steel, outside g'ds.....	70¢@75¢@82¢
Malleable.....	70¢@75¢
Gibbs' Lawn Rake.....	doz., \$4.90
Gibbs' Canton Lawn Rake.....	doz., \$3.75
Gibbs' Acme Lawn Rake.....	doz., \$4.75
Gibbs' Favorite Lawn Rake.....	doz., \$3.90
Gibbs' Crown Lawn Rake, No. 1.....	doz., \$4.90
Oneida Lawn Rake.....	doz., \$4.90
Fort Madison Prize Bow Brace and Fearless.....	65¢
Fort Madison Steel Tooth Lawn Rake.....	60¢

Razors-

J. B. Torrey Razor Co.....	20¢
Wostenholme and Butcher, \$10 to 2.....	10¢
Jordan's AAA, new list.....	Net
Jordan's Old Faithful, new list.....	Net
Salvatic.....	doz., \$15.00
Electric Cutlery Co.....	Net
Campbell Cutlery Co.....	50¢

Razor Strops-

See Strops, Razor.

Registers-

Moore's Jannaped.....	75¢
Moore's Electroplated.....	75¢
Moore's Bronze Finishes.....	70¢
Moore's Solid Bronze.....	70¢
Moore's Stove Pipe.....	33¢

Rings and Ringers-**Bull Rings-**

Union Nut Co.....	55¢
Barnes's.....	75¢@10¢
Hotchkiss' low Ring.....	30¢
Humason, Beckley & Co.'s.....	70¢@10¢
Peck, Stow & W. Co.'s.....	50¢@10¢@10¢@10¢
Richd. Hd. Co., White Metal, low list.....	50¢@10¢@10¢

Hog-

Top of the Hill Ringers.....	doz \$2.00
Top of the Hill Ringers.....	doz \$1.25
Hill's Improved Ringers.....	doz \$1.25
Hill's Old Style Ringers.....	doz \$1.25
Hill's Tongue.....	doz \$3.00
Hill's Rings.....	doz bxs \$1.00
Perfect Rings.....	doz bxs \$1.50
Perfect Rings.....	doz \$2.15@3.25
Blair's Hog Ringers.....	doz \$2.00
Blair's Hog Ringers.....	doz \$2.00
Champion Rings, Double.....	doz \$2.25
Brown's Rings.....	doz \$2.00
Brown's Rings.....	doz \$1.15@1.25
Electric Hog Ringers.....	doz boxes \$1.50
Electric Hog Ringers.....	doz \$2.00
Major Rings.....	doz \$1.25
Major Rings.....	doz \$2.00

Rivets and Burrs-

Norway Iron, list Nov. 17, '87.....	80¢@10¢
Second quality.....	70¢
Copper.....	60¢@80¢@10¢
Coppered Iron, Bettina Brand.....	60¢@2¢

Rivet Sets-See Sets.**Roasting and Baking Pans-See Pans, Roasting and Baking.****Rods-**

Stair, Brass.....	25¢@30¢
Stair, Black Walnut.....	doz 40¢

Rollers-

Barn Door, Sargent's list.....	60¢@10¢@10¢
Arme Moore's Anti Friction.....	55¢
Patent Barn Door Roller.....	70¢
Moore's Barn Door Stay.....	70¢
Thompson Mfg. Co.'s Lawn Rollers.....	30¢

Rope-The following prices are for b. New York or factory, and are shaded 1/4¢ on large lots; terms, 1 1/4 for cash.

Manilla, 7-16 in. diam. and larger.....	8¢
Manilla.....	9¢
Manilla, 1/4 and 5-16 in.....	9¢
Manilla, Tarred Rope.....	8¢
Manilla, Hay Rope.....	8¢
Sisal.....	7¢
Sisal, 7-16 inch and larger.....	7¢
Sisal, 1/4 and 5-16 in.....	8¢
Sisal, Hay Rope.....	7¢
Sisal, Tarred Rope.....	8¢
Sisal, Medium Lath Yarn.....	8¢
New Zealand, 7-16 in. & larger.....	6¢
New Zealand, 1/4 and 5-16 inch.....	7¢
New Zealand, Hay Rope.....	6¢
New Zealand, Tarred Rope.....	6¢
Cotton Rope.....	13¢@16¢
Jute Rope.....	6¢@7¢

Wire-

List February, 1892. All kinds.....	45¢
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Rules-

Boxwood.....	80¢@10¢@10¢@10¢@10¢
Ivory.....	50¢@10¢
Starrett's Steel Rules and Straight Edges.....	25¢@10¢

Sad Irons-See Irons, Sad.**Sand and Emery Paper**

See Paper and Cloth.

Sash Cord-See Cord, Sash.**Sash Locks-See Locks, Sash.****Sash Weights-**

See Weights, Sash.

Sausage Stuffers or Fillers-See Stuffers or Fillers.**Saws-**

Diston's Circular.....	45¢@45¢@5¢
Diston's Cross Cut, list Jan. 1, '93.....	40¢@10¢
Diston's Hand.....	25¢
Woodrough & McParlin.....	25¢
Hand, Panel and Rip.....	25¢@10¢
Cross Cuts, list Jan. 1, 1893.....	45¢@10¢
Wheeler, Madden & Clemson Mfg. Co.....	30¢@10¢
Hand, Panel and Rip.....	30¢@10¢
Cross Cuts, list Jan. 1, 1893.....	45¢@10¢
Atkins' Circular.....	50¢@10¢
Atkins' Cross Cuts, new list.....	50¢@10¢
Atkins' Mulay, Mill and Drag.....	50¢@10¢
Atkins' One-Man Saw.....	40¢
Atkins' Wood Saws.....	40¢
Peace Circular and Mill.....	45¢@45¢@5¢
Peace Hand Panel and Rip.....	25¢@25¢@5¢
Peace Cross Cuts, list Jan. 1, '93.....	45¢@10¢
Richardson's Circular and Mill.....	45¢@45¢@5¢
Richardson's X Cuts, list Jan. 1, '93.....	45¢@10¢
Richardson's Hand, &c.....	25¢@25¢@5¢
E. C. Jennings & Co's.....	25¢

Hack Saws-

Griffin's, complete.....	40¢@10¢@50¢
Griffin's Hack Saw Blades.....	40¢@10¢@50¢
Star Hack Saws and Blades.....	25¢
Eureka and Crescent.....	25¢

Scroll-

Lester, complete.....	25¢
Rogers, complete.....	\$10.00
Barnes' Builders' and Cab Makers'.....	\$15.25
Barnes' Scroll Saw Blades.....	35¢

Saw Frames-

See Frames, Saw.

Saw Sets-See Sets, Saw.**Saw Tools-See Tools, Saw.****Scales-**

Hatch, Counter, No. 171, good quality.....	doz \$18.00@18.00
Hatch, Tea, No. 161.....	doz \$6.50@7.00
Union Platform, Plain.....	\$2.10@2.20
Union Platform, Striped.....	\$2.40@2.50
Star Hack Saws and Blades.....	25¢
Chatillon's Eureka.....	25¢
Chatillon's Favorite.....	40¢
Family Turnbells.....	30¢@30¢
Riehle Bros' Platform.....	40¢

Scale Beams-

See Beams, Scale.

Scissors, Fluting.....45¢**Scrapers-**

Adjustable Box Scraper (S. R. & L. Co.).....	\$6.00
Box, 1 Handle.....	doz \$2.25@2.50
Box, 2 Handle.....	doz \$3.00@3.25
Defence Box and Ship.....	20¢@10¢
Foot.....	50¢@10¢@10¢
Ship, Common.....	doz \$3.50 net
Ship, R. I. Tool Co.....	10¢

Screen Window and Door

Frames-See Frames

Screw Drivers-

See Drivers, Screw

Screws-**Bench and Hand-**

Bench, Iron.....	55¢@10¢@55¢@10¢
Bench, Wood, Beech.....	doz \$2.25
Bench, Wood, Hickory.....	doz \$2.00
Hand, Wood.....	55¢@10¢@55¢@10¢
Hand, Grand Rapids, list.....	35¢

Coach, Lag and Hand-Rail-

Lag, Blunt Point, list Jan. 1, 1890.....	80¢@80¢@10¢
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....	80¢@80¢@5¢
Hand Rail, Sargent's.....	70¢@10¢
Hand Rail, H. & B. Mfg.....	70¢@10¢@75¢
Hand Rail, Am. Screw.....	75¢

Jack Screws-

Jack Screws, Millers Falls list.....	50¢@50¢@10¢
Jack Screws, P. S. & W.....	35¢
Jack Screws, Sargent.....	70¢
Jack Screws, Stearns.....	40¢@40¢@10¢

Cork-

Humason & Beckley Mfg. Co.....	40¢@10¢@50¢
Williamson's.....	35¢@35¢@5¢
Detroit Cork Screw Co.....	35¢

Machine-

Flat Head Iron.....	65¢
Round Head Iron.....	60¢

Wood-

List January 1, 1891.....	70¢
Flat Head Iron.....	65¢
Round Head Iron.....	60¢
Flat Head Brass.....	70¢
Flat Head Bronze.....	70¢
Round Head Brass.....	65¢
Rogers' Drive Screws.....	82¢@5¢

Scroll Saws-See Saws, Scroll.**Scythes-**

Grain.....	40¢@5¢@40¢@10¢
Grass.....	40¢@10¢@50¢

Scythe Snaths-

See Snaths, Scythe.

Sets-

Alken's Sets, Awns and Tools.....	No. 20, doz \$10.00.....
Fray's Adj. Tool Hds., Nos. 1, 12, 2, 18, 3, 12, 4, 30.....	45¢
Millers Falls Adj. Tool Hds.....	25¢
Nos. 1, 12, 2, 18.....	25¢
Henry's Combination Haft.....	doz \$6.50
Stanley's Excelsior.....	No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....
Common Bra. Sets.....	30¢@10¢
No. 42, \$10.50; No. 43, \$12.50.....	70¢@10¢@5¢

Nail-

Square.....	gr. \$1.00@1.25
Round.....	gr. \$3.25
Buck Bros.....	27¢
Cannon's Diamond Point.....	gr. \$12, 20¢

Rivet-**Saw-**

Stillman's Pattern, Hand.....	doz \$3.25
Cross Cut, \$8.50.....	55¢@55¢@10¢
Common Lever.....	doz \$2.00, 45¢@50¢
Morrill's No. 1, \$15.00.....	40¢@20¢
No. 11, \$16.00.....	40¢@20¢
Nos. 3 & 4, Cross Cut, \$23.00.....	40¢@20¢
Nos. 5 & 6, Cross Cut, \$21.00.....	40¢@20¢
No. 10, \$15.50.....	40¢@20¢
Leach's, No. 0, \$8.00; No. 1, \$15.....	15¢@20¢
Nash's.....	20¢@10¢@20¢@10¢
Hammer, Hotchkiss.....	\$5.50, 10¢
Hammer, Bemis & Call Co.'s new Pat.....	45¢
Bemis & Call Spring Hammer.....	30¢@5¢
Bemis & Call Co.'s Plate.....	20¢
Bemis & Call Co.'s Cross Cut.....	30¢@5¢
Aiken's Genuine.....	\$13.00, 55¢@55¢@10¢
Aiken's Imitation.....	\$9.00, 55¢@55¢@10¢
Hart's Pat. Lever.....	20¢
Diston's Star.....	25¢
Leopold.....	doz No. 1, \$4.00
Atkin's Criterion.....	doz No. 1, \$6.00
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00.....	40¢@10¢@50¢
Avery's Saw Set and Punch.....	60¢
Kohler's Royal.....	doz \$7.00
Kohler's Giant Royal.....	doz \$12.00
Crescent.....	doz \$3.00
Lloyd's Acme.....	doz \$15, 40¢
Taintor Positive.....	doz \$18, 50¢

Sharpeners, Knife-

Larkins' Applewood Handles.....	doz. \$6.00, 40¢
Rosewood or Cocobola.....	doz. \$9.00 40¢

Shaves, Spoke-

Iron.....	45¢
Wood.....	30¢
Bailey's (Stanley R. & L. Co.).....	40¢@10¢
Stearns.....	30¢@10¢
Cincinnati.....	25¢@10¢
Gouldell's.....	doz. \$9.00.....

Shears-

American (Cast) Iron.....	75¢@10¢@75¢@10¢@5¢
Barnard's Lamp Trimmers.....	doz. \$3.75
Seymour's, list Dec. 1881.....	60¢@10¢@10¢@60¢@10¢@5¢
Heinrich's, list Dec. 1881.....	60¢@10¢@10¢@60¢@10¢@5¢
Heinrich's Tapered Shears.....	35¢@5¢
First quality.....	80¢@80¢@10¢
Second quality.....	80¢@10¢@80¢@10¢@10¢
Acme Cast Shears.....	10¢@10¢
Diamond Cast Shears.....	10¢
Clippers.....	10¢@10¢
Victor Cast Shears.....	75¢@10¢@80¢@5¢
Net Bros. & Hubert, Solid Forge.....	40¢
Steel.....	60¢
Hatch Cutlery Co., Solid Steel Forged.....	40¢
Davenport Cutlery Co.....	60¢@60¢@

Snaps, Harness, &c.

Anchor (T. & S. Mfg. Co.)	50¢
Fitch's (Bristol)	50¢
Hutchins	50¢
Andrews	50¢
Margent's Patent Guarded	70¢
German, new list	40¢
Covert	50¢
Covert, New Patent	50¢
Covert, New E. E.	50¢
Covered Spring	60¢
Covert's Saddlery Works' Triumph	33¢
John Protz Snaps	70¢
Kelley & Woolworth's Steel Harness	50¢

Snaths

Scythe	50¢
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Soldering IronsSee *irons, Soldering.***Spittoons, Cuspidors, &c.****Standard Fiberware**

Cuspidors, 3/4-inch, # doz., No. 5, \$8; No. 5, \$8

Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, \$6.

Spoke ShavesSee *Shaves, Spoke.***Spoke Trimmers**See *Trimmers, Spoke.***Spoons and Forks****Tinned Iron**

Barting, Cen. Stamp, Co.'s list, 70¢

Solid Table and Tea, Cen. Stamp, Co.'s list, 70¢

Buffalo, S. S. & Co., 33¢

Silver Plated

4 months or 5¢ cash 30 days:

Meriden Brit. Co., Rogers, 40¢

C. Rogers & Bros., 40¢

Rogers & Bros., 40¢

Need & Barton, 40¢

Wm. Rogers Mfg. Co., 40¢

Simpson, Hall, Miller & Co., 40¢

Holmes & Edwards Silver Co., 40¢

L. Boardman & Son, 50¢

Miscellaneous

Holmes & Edwards Silver Co., 50¢

No. 67 Mexican Silver, 50¢

No. 30 Silver Metal, 50¢

No. 24 German Silver, 50¢

No. 50 Nickel Silver, 50¢

No. 49 Nickel Silver, 50¢

Wm. Rogers Mfg. Co., 50¢

Rogers' Silver Metal, 50¢

18¢ Rogers' German Silver, 60¢

25¢ Rogers' Nickel Silver, 60¢

German Silver, 50¢

German Silver, Hall & Elton, 50¢

Nickel Silver, 50¢

Britannia, 60¢

Boardman's Nickel Silver, list July 1, 1891, 60¢

Boardman's Britannia Spoon, case lot, 60¢

Springs Door

Torrey's Rod, 39 in., # doz. \$1.20

Warner's No. 1, # doz. \$1.50

Gem (Col), list April 19, 1886, 20¢

Star (Col), list April 19, 1886, 20¢

Victor (Col), 60¢

Champion (Col), 60¢

Cowell's No. 1, # doz. \$1.80

Rubber, complete, # doz. \$4.50

Hercules, 50¢

Carriage, Wagon, &c.

Elliptic, Concord, Platform and Half Scroll, 60¢

Cliff's Bolster Springs, 25¢

Squares

Steel and Iron, # doz. \$1.80

Try Square and T Bevels, 60¢

Disston's Try Square and T Bevels, 50¢

Winterbottom's Try and Miter, 30¢

Starrett's Micrometer Caliper Squares, 25¢

Avery's Flush Bevel Squares, 40¢

Avery's Bevel Protractor, 50¢

Squeezers**Fodder**

Blair's "Climax", # doz. \$2.00

Blair's "Climax", # doz. \$1.25

Lemon

Wood, No. 2, # doz. \$2.00

Wood, Common, # doz. \$1.70

Dunlap's Improved, # doz. \$3.75

Cammins, No. 1, \$5.00; No. 2, \$9.12

Jennings' Star, # doz. \$2.50

Dean's, Nos. 1, # doz. \$6.50; No. 2, \$9.12

Little Giant, # doz. \$5.00

King, # doz. \$4.00

Hotchkiss Straight Flash, # doz. \$12.00

Silver & Co., Glass, # gro. \$9.00

Standard Fiber WareSee *Ware, Standard Fiber.***Staples**

Barbed Blind, 1/4 in. and larger, # doz. \$7.40

Fence Staples, Galvanized, # Same price as Barbed Wire

Grand Crossing Tack Co.'s list, 75¢

Steelyards**Stocks and Dies**

Blacksmith's: Waterford Goods, 35¢

Butterfield's Goods, 35¢

Lightning Screw Plate, 25¢

Reece's New Set Plates, 25¢

Reversible Ratchet, 30¢

Gardner, 25¢

Green River, 25¢

Steps, Bench

Morrell's, # doz. No. 1, \$10.00; No. 2, \$11.00

Hotchkiss, # doz. \$5.10

Waston's, No. 1, 0 No. 2, \$9.25

Mc Gill's, # doz. \$3.10

Cincinnati, 25¢

Terrell's Nos. 1 and 2, # doz. \$3; No. 8, \$3.60

Millers Falls, 25¢

Stearns', 20¢

Stone**Stones, Grind-See Grindstones****Scythe Stones**

Pike Mfg. Co., list April, 1892, 33¢

Cleveland Stone Co., list Nov. 1892, 33¢

Oil Stones, &c.

Pike Mfg. Co.: Hindostan No. 1, # doz. \$4

Sand Stone, 40¢

Turkey Oil Stone, 4 to 8 in., 10¢

Turkey Slips, \$2.00

Lily White Washita, 60¢

Rosy Red Washita, 60¢

Washita Stone, Extra, 50¢

Washita Stone, No. 1, 40¢

Washita Stone, No. 2, 30¢

Lily White Slips, 90¢

Rosy Red Slips, 90¢

Washita Slips, Extra, 70¢

Washita Stone, No. 1, 3 to 5 in., \$2.30

Arkansas Stone, No. 1 1/2 to 3 in., \$3.50

Lake Superior, # doz. \$13

Lafayette Slips, # doz. \$20

Stove PolishSee *Polish, Stove.***Stretchers Carpet**

Cast Steel, Polished, # doz. \$2.2

Cast Iron, Steel Points, # doz. \$7.50

Socket, # doz. \$1.75

Bullard's, # doz. \$2.50

Strops, Razor

Genuine Emerson, # doz. \$2.00

Imitation, # doz. \$2.00

Tanner's, # doz. \$2.00

Badger's Belt and Comb, # doz. \$2.00

Lamont Combination, # doz. \$4.00

Jordan's Pat. Padded, list Nov. 1, '89, 50¢

Electric Cutlery Co., Net

Campbell Cutlery Co., Net

Stuffer, Sausage

Miles' Challenge, # doz. \$2.00

Perry, # doz. No. 1, \$1.50; No. 0, \$2.10

Draw Cut No. 4, each \$30.00, 20¢

Enterprise Mfg. Co., list Jan 17, '92, 25¢

Silver's, 40¢

Sweepers, Carpet and Lawn

Bissell No. 5, # doz. \$17.00

Bissell No. 8, # doz. \$20.00

Bissell, Grand, # doz. \$36.00

Standard, # doz. \$24.00

Domestic, # doz. \$21.00

Domestic, No. 2, # doz. \$22.00

Grand Rapids, # doz. \$24.00

Crown Jewel, No. 1, \$18.00; No. 2, \$19.00

Magic, # doz. \$15.00

Improved Parlor Queen, # doz. \$27.00

Nicked, # doz. \$27.00

Excelsior, # doz. \$22.00

Garland, # doz. \$18.00

Parlor Queen, # doz. \$24.00

Housewife's Delight, # doz. \$15.00

Ladies' Friend, # doz. \$15.00

Ladies' Friend No. 2, # doz. \$15.00

Our Leader, # doz. \$19.00

Triumph, # doz. \$20.00

Goshen, # doz. \$21.00

Supreme, # doz. \$22.00

Easy, # doz. \$22.00

Gilt Edge, # doz. \$24.00

Imperial, # doz. \$28.00

Grand Republic, # doz. \$30.00

Banner, # doz. \$22.00

The Star, # doz. \$21.00

Reliable, # doz. \$22.00

The Rapid, # doz. \$22.00

Our Own, # doz. \$27.00

Model, # doz. \$27.00

Goshen Sweeper Company, Grand

Rapids, Mich., make the following re-

bates:

5 dozen in 6 months, # doz. \$1.00

10 dozen in 6 months, # doz. \$2.00

25 dozen in 6 months, # doz. \$3.00

Exception L.F., when 10 dozen price is \$13.50, and 25 dozen \$13.00.

Lawn

Thompson Mfg. Co., 30¢

Swings

Davies Lawn, 25¢

Tacks, Brads &c.

List October 19, 1889. Old established

straight weights. Short Weight goods

are sold at lower prices.

Carpet Tacks

American, Blued, 60¢

American, Tinned and Cop'd, 60¢

Steel, Bright and Blued, 60¢

Steel, Tinned and Coppered, 70¢

Swedes Iron, Blued, 72¢

Swedes Iron, Tinned, 75¢

American Iron Tacks, Domestic, 60¢

Swedes Iron Tacks, 60¢

S. S., Blued, 60¢

S. S., Tinned, 60¢

Lanc., Blued, 60¢

Lanc., Tinned, 60¢

Gimp and Lace Tacks, 60¢

S. S., Blued, 60¢

S. S., Tinned, 60¢

Lanc., Blued, 60¢

Lanc., Tinned, 60¢

Basket and Trimmers' Tacks, 50¢

Lanc., 50¢

S. S., 50¢

Hungarian Nails, 50¢

Emerson and Patent Brads, 50¢

Leathered Tacks, 10¢

Brush Tacks, S. S., 30¢

Looking Glass Tacks, S. S., 30¢

Picture-Frame Points, S. S., 30¢

Finishing Nails, 60¢

Trunk and Clout Nails, 65¢

Tinned or Coppered, 67¢

Basket Nails, 60¢

Chair Nails, 52¢

Clair Box Nails, 45¢

Tin Capped Nails, 50¢

Miscellaneous

Donbie Point, 90¢

Wire Carpet Nails, 90¢

Claw Handle Carpet, 90¢

Bonnie Blue, # box 1.50

Bill Nye Brad Box, 4 00

Parlarian Gilt Nails, cartoon, 50

Home Tacks, No. 50 # case (12 car-

tons), \$36.00; No. 100, # case

(12 cartons), \$72.00.

Home Nails, No. 200, # case (12 car-

tons), \$30.00; No. 400, # case (12

cartons), \$60.00.

Upholsterers' Nails, 50¢

Wire Brads and Nails

Steel-Wire Brads, R. & E. Mfg. Co.'s list

See also *Nails, Wire.***Tanks, Oil**

Emerald, S. S. & Co.: 30-gal. \$8.75; 60-

gal., \$11 each. 50¢

Tapes, Measuring

American, 40¢

Spring, 40¢

Chesterman's, Regular list, 25¢

Thermometers

Tin Case, 80¢

Thimble Skeins-See Skeins**Ties, Bale-Steel**

Standard Wire, list, 50¢

Tinners' Shears, &c.See *Shears, Tinners' &c.***Tinware**

Stamped, Japanese and Pitted, list

Jan 20, 1887, 70¢

Tire Benders, Upsetters, &c.See *Benders and Upsetters***Tobacco Cutters**See *Cutters, Tobacco.***Tools****Coopers'**

Bradley's, 20¢

Barton's, 20¢

L. & J. White, 20¢

Albertson Mfg. Co., 25¢

Sandusky, 30¢

Shaves Cincinnati Tool Co., 20¢

Lumber

Ring Peavies, "Blue Line", # doz. \$20.00

Ring Peavies, Common, # doz. \$18.00

Steel Socket Peavies, # doz. \$21.00

Mall Iron Soap Peavies, # doz. \$19.00

CURRENT METAL PRICES.

AUGUST 23, 1893.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron:	
1 to 2 in. round and square...	¢ 1.80 @ 1.90¢
1 to 6 in. x ½ to 1 in.	¢ 1.90 @ 2.00¢
Refined Iron:	
1 to 2 in. round and square...	¢ 2.10 @ 2.20¢
1 to 4 in. x ½ to 1 in.	¢ 2.00 @ 2.10¢
1 to 6 in. x ½ to 1 in.	¢ 2.20 @ 2.30¢
Rods—½ and 1-16 round and sq.	¢ 2.20 @ 2.30¢
Bands—1 to 6 x 8-16 to No. 12.....	¢ 2.20 @ 2.30¢
"Burden Best" Iron, base price.....	¢ 2.80¢
Burden's "H. B. & S." Iron,	
base price.....	¢ 2.80¢
"Ulster".....	¢ 3.00¢
Norway Bars.....	¢ 3.75 @ 4.00¢
Norway Shapes.....	¢ 4.50 @ 5.00¢

Merchant Steel from Store—

Open-Hearth and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base	
price in small lots.....	2½¢
Best Cast Steel, base price in small lots.	8 ¢
Best Cast Steel Machinery, base price in	
small lots.....	5 ¢

Sheet Iron from Store—

Black—

Best Refined Iron.

Nos. 14 to 20.....	2.75 @ 2.85¢
21 to 24.....	2.90 @ 3.00¢
25 to 26.....	3.15 @ 3.20¢
27.....	3.30 @ 3.40¢
28.....	3.40 @ 3.50¢

Common ¼¢ less than the above.

Open Hearth Steel.

Best Soft Steel, Nos. 14 to 16.....	2½¢ @ 2½¢
" " " " 18 to 20.....	2½¢ @ 3¢
" " " " 21 to 24.....	3½¢ @ 3½¢
" " " " 25 to 26.....	3½¢ @ 3½¢
" " " " 27 to 28.....	3½¢ @ 3½¢

Best Bloom Sheets, ¼¢ extra over above prices.
Best Bloom, Galvanized, d.s. 70¢ & 5 @ 70¢ & 10¢
Ordinary Bessemer, ¼¢ @ ¼¢ lower than above prices.

Russia, Planished, &c.

Genuine Russia, according to	
assortment.....	¢ 12¢ @ 13¢
Patent Planished.....	¢ 10¢ @ 10½¢
Orag Planished Sheet Steel.....	¢ 8½¢

English Steel from Store—

Best Cast.....	¢ 15 ¢
Extra Cast.....	¢ 16½¢
Swaged, Cast.....	¢ 16 ¢
Best Double Shear.....	¢ 15 ¢
Blister, 1st quality.....	¢ 12 ¢
German Steel, Best.....	¢ 10 ¢
3d quality.....	¢ 9 ¢
3d quality.....	¢ 8 ¢
Sheet Cast Steel, 1st quality.....	¢ 15 ¢
3d quality.....	¢ 14 ¢
3d quality.....	¢ 12½¢
R. Mushet's "Special".....	¢ 48 ¢
" " " " Annealed.....	¢ 75 ¢
" " " " "Titanic".....	¢ 20 ¢

METALS—

Tin—

Banco, Pigs.....	21½¢
Straits, Pigs.....	20½¢ @ 21¢
Straits in Bars.....	22¢

Tin Plates—

Duty: 2½¢ ¢ lb.

Charcoal Plates—Bright—

Guaranteed Plates command special prices,	
according to quality.....	Per box.
Melvin and Calland Grade, IC, 10 x 14.....	@ \$6.50
" " " " " " 10 x 12.....	@ 6.75
" " " " " " 10 x 12.....	@ 6.50
" " " " " " 10 x 20.....	@ 13.00
" " " " " " 10 x 14.....	@ 8.50
" " " " " " 10 x 12.....	@ 8.75
" " " " " " 10 x 20.....	@ 8.50
" " " " " " 10 x 20.....	@ 17.00
" " " " " " 10 x 17.....	@ 6.00
" " " " " " 10 x 17.....	@ 8.00
" " " " " " 10 x 14.....	@ 6.00
" " " " " " 10 x 12.....	@ 6.25
" " " " " " 10 x 20.....	@ 6.00
" " " " " " 10 x 20.....	@ 12.00
" " " " " " 10 x 14.....	@ 7.50
" " " " " " 10 x 12.....	@ 7.75
" " " " " " 10 x 20.....	@ 7.50
" " " " " " 10 x 20.....	@ 15.00
" " " " " " 10 x 17.....	@ 5.50
" " " " " " 10 x 17.....	@ 7.00

Alloy Grade.....

" " " " " " 10 x 14.....	@ 6.00
" " " " " " 10 x 12.....	@ 6.25
" " " " " " 10 x 20.....	@ 6.00
" " " " " " 10 x 20.....	@ 12.00
" " " " " " 10 x 14.....	@ 7.50
" " " " " " 10 x 12.....	@ 7.75
" " " " " " 10 x 20.....	@ 7.50
" " " " " " 10 x 20.....	@ 15.00
" " " " " " 10 x 17.....	@ 5.50
" " " " " " 10 x 17.....	@ 7.00

Coke Plates—Bright—

Steel Coke, IC, 10 x 14, 14 x 20.....	@ \$5.40
" " " " " " 10 x 20.....	@ 5.50
" " " " " " 10 x 20.....	@ 8.50
" " " " " " 10 x 20.....	@ 12.00
" " " " " " 10 x 20.....	@ 7.00
" " " " " " 10 x 20.....	@ 5.50

Charcoal Plates—Terne—

Guaranteed Plates command special prices	
according to quality.....	Per box.
Dean Grade, IC, 10 x 14 x 20.....	@ \$5.65
" " " " " " 20 x 28.....	@ 11.00
" " " " " " 14 x 20.....	@ 6.40
" " " " " " 20 x 28.....	@ 12.80
" " " " " " 20 x 28.....	@ 5.55
" " " " " " 20 x 28.....	@ 10.75
" " " " " " 14 x 20.....	@ 6.40
" " " " " " 20 x 28.....	@ 12.80

Tin Boiler Plates—

IXX, 4x 26.....	112 sheets @ \$13.35
IXX, 14 x 28.....	112 sheets @ 14.50
IXX, 14 x 31.....	112 sheets @ 16.00

American Terne Plates—Apollo.

IC, 14 x 20.....	\$6.25
IC, 20 x 28.....	12.50
IC, 14 x 20.....	7.25
IX, 20 x 23.....	14.50

Copper—
Duty: Pig, Bar and Ingot, 1¼¢; Old Copper, 1¢ ¢ lb. Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad valorem.

Ingot—

Lake.....	@ 11 ¢
Ansonia grade Arizona.....	@ 10½¢
Ansonia grade Casting.....	@ 10 ¢

Sheet and Bolt—

Prices adopted by the Association of Copper Manufacturers of the United States, May 19, 1892. Subject to a discount of 15¢ @ 25¢, according to size of order.

Not wider than	Not longer than	And longer than	Weights per sq. foot and prices per pound.									
			Over 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.	64 to 64 oz.
30—72.....	22	23	23	23	23	23	23	23	23	23	23	23
30—72.....	22	23	23	23	23	23	23	23	23	23	23	23
38—96.....	22	23	23	23	23	23	23	23	23	23	23	23
38—96.....	22	23	23	23	23	23	23	23	23	23	23	23
48—96.....	22	23	23	23	23	23	23	23	23	23	23	23
48—96.....	22	23	23	23	23	23	23	23	23	23	23	23
60—96.....	22	23	23	23	23	23	23	23	23	23	23	23
60—96.....	22	23	23	23	23	23	23	23	23	23	23	23
84—96.....	22	23	23	23	23	23	23	23	23	23	23	23
84—96.....	22	23	23	23	23	23	23	23	23	23	23	23
Over 84 in. wide	25	27	27	27	27	27	27	27	27	27	27	27

Bolt Copper, ¼ inch diameter and over, per pound..... 22¢
Circles, Segments and Pattern Sheets, 60 in. diameter and less, 3¢ ¢ lb advance over prices of Sheet Copper required to cut them from.
Circles, Segments and Pattern Sheets, over 60 in. diameter, up to 96 in. diameter inclusive, 4¢ ¢ lb advance over prices of Sheet Copper required to cut them from.
Circles, Segments and Pattern Sheets, over 96 in. diameter, 5¢ ¢ lb advance over prices of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper 14 oz. ¢ square foot and heavier, 1¢ ¢ lb over the foregoing prices.
Cold or Hard Rolled Copper lighter than 14 oz. ¢ square foot, 2¢ ¢ lb over the foregoing prices.
All Polished Copper over 20 in. wide, 2¢ ¢ lb advance over the foregoing prices.

Copper Bottoms, Pits and Flats—

14 ounce to square foot and heavier.....	26¢
12 ounce and up to 14 ounce to square foot.....	27¢
10 ounce and up to 12 ounce.....	29¢
Lighter than 10 ounce.....	32¢
Circles less than 8 inches diameter, 2¢ ¢ lb additional.	
Circles over 18 inches diameter are not classed as Copper Bottoms.	
15¢ @ 25¢ discount, according to size of order.	

Copper Wash Bowl Bottoms—

Tinned..... ¢ 34¢, 15¢ @ 25¢

Tinning—

Tinning sheets on one side, 10, 12 and 14 x 48 each.....	8¢
Tinning sheets on one side, 30 x 60 each.....	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.....	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each.....	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each.....	12¢
Tinning sheets on one side, other sizes, per square foot.....	2½¢
For tinning both sides double the above prices.	

Planished Brass and Copper—

Not larger than 30 x 60.

16 oz. and heavier..... 24¢ ¢ lb

14 oz..... 25¢ ¢ lb

12 oz..... 27¢ ¢ lb

Seamless Brass Tubes—

O. G.	N. G.	3/4	1/2	3/8	1/4	3/16	1/8	1/16
8-14	6-12	32	28	25	24	23	22	19
15	13	38	32	28	26	25	24	20
16	14	34	29	27	26	25	24	20
17	15	35	30	28	27	26	25	21
18	16	37	31	29	27	26	25	22
19	17	38	32	30	29	28	27	24
20	18-19	39	34	32	31	30	29	26
21	20	41	36	34	33	32	31	29
22	21	43	37	35	34	33	32	31
23	22	45	39	37	36	35	34	34
24	23	48	41	39	38	36	35	36
25	24	51	44	41	40	39	38	40

Copper, Bronze and Gilding Tube, 3¢ ¢ lb additional

Brass Tubing. (To No. 20 inclusive)..... 35¢

Above 5-16 inch to 3 inch, inclusive..... 45¢

Plain, 3-16 inch..... 45¢

Plain, 1/4 inch..... \$1.00

Plain, 3-16 inch..... \$1.50

Fancy Tubing, Brass, to No. 20, inclusive..... 43¢ ¢ lb

Bronze Tubing, 3¢ ¢ lb more than Brass.

Discount from list..... 30¢ @ ..%

Roll and Sheet Brass—

(Brown & Sharpe Standard Gauge.)

Common High Brass:	in.	in.	in.	in.	in.	in.	in.	in.
Wider than	10	12	14	16	18	20	22	24
and including								
To No. 20, inclusive.....	21	22	23	25	27	29	31	33
Nos. 21, 22, 23 and 24.....	32	33	34	36	38	40	42	44
Nos. 25 and 26.....	22½	23½	24½	27	29	31	33	35
Nos. 27 and 28.....	28	29	30	32	34	36	38	40

Common High Brass:	in.	in.	in.	in.	in.	in.	in.	in.
Wider than	24	26	28	30	32	34	36	38
and including								
To No. 20, inclusive.....	36	39	42	46	50	55	60	65
Nos. 21, 22, 23 and 24.....	37	40	43	47	51	56	61	66
Nos. 25 and 26.....	38	41	44	48	52	57	62	67
Nos. 27 and 28.....	39	42	45	49	53	58	63	68

Discount from List 15¢ to 25¢.

Brass and Copper Wire—

List January 17, 1884.

Numbered by Stub's gauge.	Soft & hard high brass.	Spring high brass.	Low brass.	Copper.
All Nos. to No. 16, inclusive.....	\$0.22	\$0.24	\$0.26	\$0.30
No. 17 and No. 18.....	.23	.25	.27	.31
No. 19 and No. 20.....	.24	.26	.28	.32
No. 21, or 0.032 diameter.....	.25	.27	.29	.33

Discount 15¢ to 25¢.

Fine Numbers.

Numbered by London gauge.	Brass.	Spring high brass.	Low brass.	Copper.
No. 22.....	\$0.26	\$0.28	\$0.30	\$0.34
No. 23.....	.28	.30	.32	.36
No. 24.....	.30	.32	.34	.38
No. 25.....	.32	.34	.36	.40
No. 26.....	.35	.37	.39	.43
No. 27.....	.38	.40	.42	.46
No. 28.....	.42	.44	.46	.51
No. 29.....	.45	.47	.49	.54
No. 30.....	.48	.50	.52	.56
No. 31.....	.51	.53	.55	.57
No. 32.....	.55	.57	.59	.62
No. 33.....	.59	.61	.63	.66
No. 34.....	.64	.66	.68	.71
No. 35.....	.70	.72	.74	.78
No. 36.....	.76	.78	.80	.84
No. 37.....	1.00	1.02	1.04	1.10
No. 38.....	1.30	1.32	1.34	1.40
No. 39.....	2.00	2.02	2.04	2.10
No. 40.....	2.60	2.62	2.64	2.70